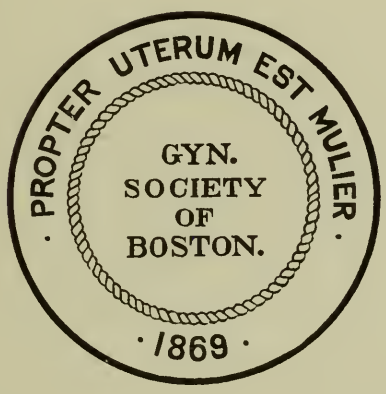
TRANSACTIONS

OF THE

GYNÆCOLOGICAL SOCIETY

OF BOSTON.

NEW SERIES.—VOL. I.



"Worn-out, friend, is every theory: but forever fresh is the tree of life."—GOETHE.

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PREFACE.

The Gynæcological Society of Boston was founded Jan. 22, 1869, and consisted originally of eight members. Dr. Horatio R. Storer was its principal founder, and for several years its Secretary. Only two of the founders at present retain their connection with the Society as Active Members; namely, Dr. Henry M. Field and Dr. William G. Wheeler.

Seven volumes of Transactions (1869–1872) were published under the title of "The Journal of the Gynæcological Society of Boston," edited by Drs. Winslow Lewis, Horatio R. Storer, and Geo. H. Bixby. These interesting volumes have long been out of print, command a high price, and have been frequently referred to by prominent gynecologists in both hemispheres. A considerable portion of the American cases quoted by the late Professor Schroeder, in Vol. X. Ziemssen's Cyclopedia, are taken from this Journal.

Besides the names of Honorary and Active Members printed in this volume, the Society numbers fully six hundred Corresponding Members, resident in the United States, Canada, and Europe.

Boston, May, 1889.

CONTENTS.

	Page.
Preface	3
Officers for 1889	7
List of Honorary Members	9
List of Active Members	11
List of Corresponding Members (recent)	13
Annual Address on the Progressive and Conservative Spirit in Medical Science, by HORACE C. WHITE, M.D., Pres.,	17
The Ethics of Abortion as a Method of Treatment in Legitimate Practice. J. E. KELLY, F.R.C.S.I., M.R.I.A.	25
Habitual Constipation in Women. HERBERT J. HARRIMAN, A.M., M.D.	46
Treatment of Constipation. HENRY M. FIELD, M.D.	52
Relations of certain Bacteria to Puerperal Inflammations. ERNEST W. CUSHING, M.D.	65
Rapid Dilatation of the Cervix Uteri. AUGUSTUS P. CLARKE, A.M., M.D.	91
Corrosive Sublimate Internally. CHARLES W. STEVENS, M.D.,	101
Chronic Cystitis in Women. W. SYMINGTON BROWN, M.D.,	105
The Dress of Women: its Relation to the Etiology and Treatment of Pelvic Disease. HELEN L. BETTS, M.D.	119
The Treatment of Cicatrices in the Collum Uteri and in the Roof of the Vagina. A. MARTIN, M.D.	133
The Obstetric Forceps. SAMUEL N. NELSON, A.M., M.D.	142
Gynecic and Obstetric Uses of Chloral Hydrate. MARSHALL L. BROWN, M.D.	159
Post-Uterine Abscess. MOSES D. CHURCH, M.D.	167
Puerperal Metritis, complicated by Malaria. ALBERT L. NORRIS, M.D.	175

Bacteria in Parturition. HENRY O. MARCY, A.M., M.D., LL.D. 182
Uterine Fibroid with Pelvic Cellulitis. MARY E. BATES, M.D. 192
Septicemia. WILLIAM G. WHEELER, M.D. 199
The Role of the Ovary. W. SYMINGTON BROWN, M.D. . . 209
Observations on Ovariotomy. JOHN C. IRISH, M.D. . . 219
Micro-Organisms, and their Relation to Disease. SAMUEL N. NELSON, A.M., M.D. 224
Faradism in the Practice of Gynecology. AUGUSTUS P. CLARKE, A.M., M.D. 247
Ergot in Obstetrics. CHARLES W. STEVENS, M.D. . . 256
The Perineum: its Anatomy, Physiology, and Methods of Restoration after Injury. HENRY O. MARCY, A.M., M.D., LL.D. 262
The Diagnosis and Treatment of Cancer of the Breast. J. COLLINS WARREN, M.D. 302
The Induction of Premature Labor. ELIZABETH C. KELLER, M.D. 328
The Animal Suture. FRANK L. BURT. M.D. . . . 340
Specialists and Especialists. W. SYMINGTON BROWN, M.D. 350
A Few of the Errors and Misapprehensions of My Earlier Gynecological Practice. HENRY M. FIELD, M.D. . 356
Is Obstetrical Antisepsis Practicable or Necessary? R. CYRENE MCDONALD, M.D. 377
Index 385

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ANNUAL ADDRESS.

THE PROGRESSIVE AND CONSERVATIVE SPIRIT IN MEDICAL SCIENCE.

BY HORACE C. WHITE, M.D., PRES.,
OF SOMERVILLE, MASS.

Delivered January 12, 1887.

In the broad domain of medical science there is room for many laborers; each may cultivate his chosen field for his own profit and for the general good. The historian records the discoveries and inventions of the past, relates the rise and overthrow of theories, and teaches us the errors, as well as the truths, which have been promulgated. He that collates from reports and statistics furnishes sometimes important, and sometimes unreliable data upon which to form opinions and theories.

The investigator, whether his researches are in the laboratory or by the sick bed, is often discovering new facts, and frequently advancing new theories. These theories are put to the test, and approved or condemned by him who stands in the presence of disease and death, and who, furnished and equipped by the results of the labor of his predecessors, and his own experience, takes the responsibility to act. Knowledge is vast and life is short. Each in his own sphere may act his part.

The advanced thought of to-day is the conservatism of to-morrow. The winnowing sieve of experience separates the grains of truth from the chaff of error; the former is eternal, the latter is the rubbish of the past. The world is full of books; but a not very large volume would contain all well proven facts. The late Prof. Cleaveland, of Bowdoin

College, gave as the best definition of science, "classification and induction." One of his successors defines natural science as "that theory which will explain most of the phenomena."

The first definition is correct for exact science only; otherwise we may classify well proven facts and those, often warped and twisted to prove theories which may have been taught, with what time proves to be but error. We must take the second definition to apply to medical science, if indeed it yet can be called a science.

Theories must frequently be changed with increasing knowledge. New facts, both physiological and pathological, require an almost continual readjustment, and often a radical change, in theory.

The microscope is revealing hitherto hidden mysteries. Collateral sciences are developing unknown forces and opening up new fields of investigation, while more scientific observation and careful recording of cases gives us much data upon which to revise long-unchallenged opinions. But not until we can comprehend that seeming impassable barrier, a want of knowledge of the vital force, or can get some conception of the origin and nature of force as applied in the natural sciences, can we expect to attain anything like permanence in our theories. Thomas Carlyle says: "Science has done much for us; but it is a poor science that would hide from us the great, deep, sacred infinitude of Nescience, whither we can never penetrate, on which all science swims as a mere superficial film." "The world," he says, and he might with equal truth have said the human body, "after all our science and sciences, is still a miracle, wonderful, inscrutable, magical and more, to whosoever will think of it." And yet each generation goes building up new theories and fortifying them with facts, both seeming and real, until its successors, or the advanced thinkers of the day, tear them down to build anew.

Against all these innovations stands Conservatism, de-

fending the theories of the past as a patriot defends home and country; and, not only standing on the defensive, it sometimes attacks what it believes to be its enemy, with all the power at its command, using even sometimes the sharp sword of ridicule and sarcasm.

Have not these theories stood the crucial test of experience? True, they sometimes failed; but was not the failure merely an exception so conveniently believed necessary to prove the rule, or explained as an accident, which might have been avoided? These well-tried theories he is loath to give up even when, in the light of new truths, another will explain more of the phenomena.

> "My very chains and I grew friends,
> So much a long communion tends
> To make us what we are."

The earnest seeker after truth should be both progressive and conservative.

This is an age of brilliant scientific investigation and dazzling theories, and while we should not be captivated by their mere brilliancy, we should give them an unprejudiced examination and an impartial judgment. Koch, Pasteur, and others, by their investigations and speculations in biological germs, have given a new impetus to scientific thought in its relation to pathological processes. New theories have been founded and old theories threatened. Honest conservatism will not be hasty to accept the new, but it will be ready to listen, to examine, and to acknowledge that which time and experience prove.

All must acknowledge that the practice which has grown out of the germ theory, so ably taught by Lister and his zealous disciples, has proved that scrupulous cleanliness is essential to success in all surgical operations, and that, when experience has eliminated some of the hasty conclusions, much of value will be left, and that many of the phenomena of pathological processes are best explained on these theo-

ries. Scientific thought is ever progressive. New theories are evolved from the old. "The originals," says Emerson, "are not original." There should be nothing but generous contention between the progressive and conservative scientist. All new discoveries or innovations upon the customs or thought of the times are liable to encounter an ungrateful and often persecuting spirit. The torture of Galileo, the imprisonment of Columbus, the ridicule and misrepresentation with which the new discoveries of Harvey and Jenner were received by even the scientific men of their day, are only illustrations of the fact; nor can these examples be credited wholly to the ignorance or bigotry of the past; the same spirit often shows itself in some form at the present day.

Some of you gentlemen can remember the abuse heaped upon some of the most eminent surgeons of Boston when they first tested the anesthetic virtue of sulphuric ether, by some of the leading medical journals of this country. For the benefit of younger members, I quote one of the many criticisms of that day. The *Philadelphia Medical Examiner*, after detailing the reports of its trial by Drs. Warren, Haywood, and Bigelow, says: "We are persuaded that the surgeons of Philadelphia will not be seduced from the high professional path of duty into the quagmire of quackery by this will-o'-the-wisp; and, if any of our respectable dentists should be tempted to try this new patent medicine, we advise them to consider how great must be the influence of an agent over the nervous system to render a person unconscious of pain — the danger there must necessarily be from such overpowering medication; and that if a fatal result should happen to one of their patients, what would be the effect upon their conscience, their reputation, and business, and how the practice would be likely to be viewed by a Philadelphia court and jury? We cannot close these remarks without again expressing our deep mortification and regret that the eminent men who have so long adorned the profession

in Boston should have consented for a moment to set so bad an example to their younger brothers as we conceive them to have done in this instance. If such things are to be sanctioned by the profession, there is little need of reform conventions, or any other efforts to elevate the professional character; physicians and quacks will soon constitute one fraternity."

How oddly this sounds when we remember the priceless boon to suffering humanity and the inestimable value to surgical science which the discovery of the anesthetic property of sulphuric ether has been. Shall we not, then, take warning by the past; and, while we may be conservatively slow in accepting new theories or in attempting dangerous experiments, we should be equally careful not to hastily condemn every innovation upon the accepted theories and practices of the past, honestly seeking after truth and fearlessly defending it. The rapid growth of medical societies and their divisions into the various specialties, during the past few years, gives opportunity for full and frequent discussion on topics of interest to the profession. New and old theories must stand on their merits. Their disciples and defenders must at all times be ready to give a reason for their faith and defend it from assault; here each has a chance to question and demand proof, and each has an opportunity to prove, illustrate, and relate his experience. If it possess merit, it will withstand all the arguments which can be brought against it, or all the ridicule which may be heaped upon it, and come out like wheat from the winnowing mill or new coins from the mint; but, if it is wanting in merit, it will soon take its place among the heaps of useless rubbish with its kindred companions of exploded dogmas and worthless inventions. Such free discussions cannot but be of great value to true scientific knowledge, if carried on with no feeling but that of generous contention and for disinterested purposes.

The past year has been a memorable one in its influence

upon society work, and in the impulse which has been given to the scientific study of medicine in this country. The meeting of the Ninth International Congress, at Washington, bringing together as it did eminent scientific men from different parts of the civilized world, each contributing by his presence, and many by their labors, to enrich the feast of medical scientific thought and fraternal relations. The amount of valuable original work was not small, and if, as Lowell says, "Originality consists quite as much in the power of using to purpose what it finds ready at hand, as in that of producing what is absolutely new," then the amount of original work was indeed vast as well as valuable. Not alone in the work there produced will the influence of the Congress be felt, but by the stimulation to investigation and study which will be felt, may we not hope, for many years to come. The Section of Gynecology was ably sustained, and the enthusiastic attendance upon its meetings proved the interest which was felt in this department of medical science. Much credit was due, and cordially awarded to, the President, Dr. Marcy, an honored member of our Society, whose indefatigable labor and eminent ability in organizing the Section, and whose courteous manner in presiding, did so much to deserve success. He was ably assisted by several other members of our Society, by many eminent gentlemen of this country and from abroad. Notably among those who were interested in this Section and whose acknowledged rank in the profession in the countries which they represented gave great interest to their papers and discussions, were Drs. Martin of Berlin, Grailly Hewitt of London, Reed of Glasgow, Apostoli of Paris, and Cordes of Geneva, with many others of first rank in this and other countries. With this array of talent so well organized, the meetings were interesting and profitable. Among the subjects discussed which have been considered by our Society with interest during the past year was that of uterine myoma. Its treatment, in suitable cases, by ergot, was ably presented, as also

by electricity, which called forth much discussion. Dr. Apostoli's method of using electricity in gynecology was fully explained and discussed. Dr. Martin's operation for vaginal total extirpation of the uterus for carcinoma, which several of you gentlemen had the pleasure of witnessing while he was in Boston, was elaborately explained and illustrated; but space will not permit me to give even a synopsis of what was presented of interest to our Society.

The Gynæcological Society of Boston can and ought to do efficient service in this important and honorable field of labor. Its talents are versatile, its spirit both progressive and conservative. It has in its membership ardent and enthusiastic investigators, men who do not feel obliged to stop where their predecessors did, or to take as proved all they have been taught, but who, with clear heads and steady nerves, are carefully exploring in untrodden paths by the light of advanced scientific thought and with all the appliances of modern art. It has also men with the experience of years upon them, men who have had grand success with old theories, and who have a right, by reason of their past success, to be conservative and hold fixed opinions. Some who have spent much time in the hospitals and laboratories studying their specialties with the best advantages and under the great masters of our art, and some who, although less favored, perhaps, in these respects, have been taught independence and self-reliance from necessity while treating all "the ills which flesh is heir to" in country practice, where they were obliged to act with the best light they had, and watch the results with no one to counsel them or share the great responsibilities, and some who have just entered upon the responsible duties for which they have been for years preparing themselves, full of enthusiasm and hope. Our Society is also honored by having in its membership ladies possessing not only the education and experience of the sterner sex, but also a keener sense of the wants and of the peculiar nature of the diseases of which our specialty calls upon us to treat.

In our list of Honorary Members may be found the names of gentlemen who are known the world over, and who are acknowledged as leaders in gynecological studies and practice. With this array of talent working harmoniously together, the possibilities of our Society for good to each member and the communities in which we live are very great.

THE ETHICS OF ABORTION AS A METHOD OF TREATMENT IN LEGITIMATE PRACTICE.

BY J. E. KELLY, F.R.C.S.I., M.R.I.A.
OF NEW YORK, N. Y.

Read September 9, 1886.

THE object of this paper is to investigate the ethical relation of the physician to the production of abortion in legitimate practice, and to consider his duties and responsibilities, when the question would intrude itself without the possibility of evasion, as in those cases of deformed pelvis and uncontrollable vomiting in which the operation is regarded as the last hope of the afflicted female.

Owing to the recognized and stable position which abortion has attained in therapeutics, I have refrained from questioning its claim to be classed among the resources of medicine, and I have also excluded the consideration of its criminal or felonious aspect, much as I may marvel at the prevalence of a horrible crime which is devastating this fair land, and curtailing by the million the development of its population and its power. This aspect of the subject has been treated by many able writers, whose experience, naturally, has been far greater than that which has been afforded me by the revelations attending a comparatively short residence in Boston. I have endeavored to avoid, as far as it is possible in dealing with a subject so involved, all arguments based upon the doctrines of any particular creed, as well as any special reference to medico-legal authorities; because I wish to induce my audience to approach the subject dispassionately, and to permit each individual to reflect upon it independently of the preconceptions derived from religious teachings and professional prejudice. In the complex conditions of modern civilization, the most honorable and

humane men are frequently constrained by their surroundings to entertain views and to perform acts from which, upon consideration, they would shrink aghast. This insensibility is largely the result of the accretion of thought and the consequent growth of habits and popular beliefs; of the confusion of the relative bearings of associated ideas, and the resulting perversion of personal opinion and human sympathy. We perform many acts of injustice and cruelty owing to the difficulty of disentangling the great underlying principles, and, in the struggle for existence, which suppresses all tendency to introspection, we are precipitated into psychological quagmires by custom, confusion, and self-interest. Such, I am satisfied, is the condition of the professional mind in relation to abortion, and I write this paper for the purpose of inducing the thoughtful physician to reconsider his duty and responsibilities, as well as to investigate the basis of the popular idea, that, owing to the adoption of the most humane calling, a physician should be expected to produce abortion at the behest or for the benefit of any individual. I have appended a few suggestions indicating a possible method of relieving the profession from this unjust and odious responsibility, while extending to the parent and the fœtus the fullest measure of human justice.

As a preliminary to the consideration of the "Ethics of Abortion," it is necessary to recall the salient points relating to the vitality and the individuality of the fœtus, and to endeavor to determine at what point of intra-uterine life it attains a right to be regarded as a fellow-mortal. It is unnecessary to remind you that, as physiologists, we cannot accept the *dictum* of Aristotle, who held that the fœtus did not attain viability until the fortieth day after the fruitful coition, neither can we coincide with those legal authorities who hold that the *human* offspring is not a *human* being until it ceases to be *pars viscerum matris*, and is completely extruded from the body of the mother. It is satisfactory to know that the definition is not universally accepted, many

judicial writers regarding it as erroneous and productive of crime, owing to the immunity from punishment which it affords to the evil-doer. On the other hand, it is interesting to discover that theologians and biologists agree upon the period at which independent life becomes the attribute of the fœtus. The former hold as a dogma, that, with the act of impregnation, instantaneously originates an absolutely independent life, which confers upon the individual the indestructible soul, with all its associated rights and responsibilities; while the latter insist that at the moment of the fusion of the male and female germs vitality is established and the essential components of the mature individual are represented, the development which subsequently elaborates all the structural details proceeding by the innate differentiation of the impregnated ovum.

I would remind you that at a very early stage of the so-called vegetative life of the fœtus the essential characters of the vertebrate animal appear in rapid succession to the primitive groove which presents itself in the blastodermic membrane within a few days of impregnation. The vertebral column appears in the first week and arrives at the cartilaginous stage in the sixth; the intestinal tract is recognizable in the second week; the heart and lungs are visible in the third week, and the duplex character of the former is apparent in the seventh; the cerebro-spinal centres appear in the third week, the brain being distinguishable in the fourth. This characteristic human organ is rapidly developed, and in the fourth month it differs only in size from its condition at birth, while the organs of the special senses, as well as the sympathetic and sensori-motor nerves, are developed simultaneously with the brain.

We must remember that immediately after impregnation, vital phenomena are manifested in cell-proliferation, differentiation, nutrition, and organization. With the exception of respiration, all the functions are performed early in fœtal life: the heart pulsates; the circulation is complete and in-

dependent of that of the mother; the intestines contract and the fæces are expelled; urine, as well as bile and the other intestinal fluids are produced; the skin develops hair and epithelium, while its secretions are produced in abundance. At a very early period we recognize the physical conditions essential to the manifestation of the simpler nervous phenomena, namely, a nervous centre connected with afferent and efferent nerves. In the fourth or fifth month mobility is very apparent in the well-known and complex symptom of "quickening," and from that period we have ample proof of reflex and, apparently, of spontaneous or sensori-motor phenomena. If we coincide with Locke as to the capacity for ideation which infants possess, it is difficult to deny similar powers to the fœtus immediately before birth, and still more so to define the dawn of sensation and volition in an individual possessing all the essential organs in a condition differing only in degree from their more mature development. The capacity of the fœtus to perceive pain is impossible of proof, yet it is but fair to recognize that this power is contemporaneous with the development of the sensory zone of the cerebrum in the fourth month. Consequently we may reasonably conclude that, at least after this period, abortion is a source of suffering to the fœtus proportionate to its age and the violence employed in the operation. The conclusion at which we must arrive, a conclusion corroborated by the teachings of religion, is that from the instant at which impregnation occurs and the ovum receives life, the fœtus is human, and at all periods differs in degree and not in kind from the infant and the adult. Therefore, we must regard it as a "human being," with an inalienable right to life, and that its destruction is homicide.

If you permit me to remind you that homicide includes the destruction of human life under every possible circumstance, and that it is divisible into justifiable, excusable, and felonious, I shall endeavor to assign to abortion its proper

position in this category. Here I may mention that, for the sake of brevity and precision, I have adopted the legal signification of "Abortion," which includes the destruction of the fœtus at all periods and under all circumstances between conception and "full term." Justifiable homicide comprises all those cases in which life is voluntarily destroyed owing to a motive which renders the act meritorious, as in warfare; in obedience to the command of a properly constituted authority; by an official in the performance of a duty imposed upon him; in the prevention of forcible or heinous crime, or for the protection of the life or honor of the slayer or of some person dependent upon him. The justification is, however, limited by the most stringent conditions, and to slay the greatest malefactor extrajudicially is wilful murder. A judge without a commission from the authorities cannot command the execution of a criminal even after the most impartial trial; the execution must correspond accurately with the sentence. A homicide committed by an officer of the law must be absolutely necessary for the performance of an imposed duty; even an individual in self-defence, or interfering to avert a great crime, must have adequate motives for his action. Any departure from these conditions converts the act into wilful murder. Homicide is excusable when it is caused by mischance or accident, except when the slayer manifests a wanton disregard for the safety of others; and when the life or valuable property of the slayer, who must not provoke the affray, is in imminent danger. Felonious homicide is always wilful murder, or murder of the first degree, unless alleviated into manslaughter, or murder of the second degree, by being the involuntary and unfortunate consequence of some act not strictly lawful, or occasioned by some sudden and sufficient provocation. Wilful murder is characterized by premeditation or malice aforethought, which, among many other conditions, includes the intention or, even without the intention, the knowledge of the liability of the act to kill or injure any person, though that person be other than the victim of the violence.

Abortion is not justifiable homicide, because it is not commanded or permitted by any authority, the law forbidding it under every circumstance, and all Christian religions agreeing in refusing to countenance the deed. It is not decreed by a legal tribunal or committed by a specially commissioned officer of justice in the performance of a necessary duty, or by the operator as a public executioner. It cannot be said to prevent the fœtus from committing a violent or heinous crime; the life, honor, or property of the physician, or that of any one having an ethical claim upon him for protection, is not in danger. In addition, it is obvious that the restrictions which qualify the privilege are also in full force against the act. Abortion is not excusable homicide, because it cannot be the result of mischance or accident; it is not performed in self-defence by the physician, nor can the contingency be considered as unprovoked by the parent. Abortion cannot be held to be manslaughter, because the very nature of the case demands grave premeditation and definite plan of action, which constitute malice aforethought; sudden and sufficiently violent provocation is impossible on the part of the fœtus, and abortion is performed with the obvious intention to commit an aggravated felony, and the operator has perfect knowledge of the fatal nature of the act. Thus, presenting all the essential conditions, we must look upon abortion as nothing less than wilful murder. But is it not a still greater crime? Crimes are divided into natural and unnatural, the latter consisting of all those acts which are contrary to the great fundamental and natural instincts of self-preservation and reproduction of species. Abortion is an act which is directly antagonistic to reproduction, and as such, like suicide and other crimes which are unnamable, it is unnatural. Consequently it is a greater crime even than wilful murder; a

"Murder most foul and most unnatural."

We shall now consider the relations of parents to their

offspring, and the foundation of their claims to the life which they have conferred. Divesting this gift of its inscrutable and preternatural qualities, let us regard it in the light of an ordinary worldly benefaction. According to the statutes regulating Ownership, when a gift is of such a nature that it cannot be formally bestowed and accepted, any act conferring upon the recipient or donee the power of using the article constitutes him the absolute owner. Apparently this is the statute which approximates most closely to the transference of life from the parents to the fœtus. Possession is another legal basis of ownership which, for the prevention of injustice, throws the *onus* of proof on the claimant, and, in addition, as the transmitted life is neither real nor personal property, a claim to its resumption cannot be based upon any existing law. The gift of vitality, which is essential to the existence of the recipient, is voluntarily or thoughtlessly discarded by the parents in the pursuit of pleasure and the gratification of a passion. The donors must be held to be cognizant of the probable effects of this act, and the deed is ratified by being sealed with the image of God, which conveys to the fœtus the infinitely greater gift of the immortal soul. Consequently the life must be regarded as the inalienable and lawful property of the recipient, who can be deprived of it only by an unjust and despotic act. Such are the usual conditions under which life is transmitted from the parents to the offspring, and for the gift the latter appears to be under no moral obligation, and least of all that of surrendering it. Filial duty is rather the result of subsequent solicitude and parental services which, accumulating during the periods of infancy and adolescence, render the claim of the parent upon the life of the offspring directly proportionate to its age. However, if we admit for a moment the right of the parent to the life of the offspring, it is easy to conjecture many cases after birth in which the resumption might be defended by all the arguments used in favor of abortion, in addition to the other considerations which I have just

suggested. Let us assume, for example, that a parent reduced by hæmorrhage has, humanly speaking, but one chance of life, that by transfusion of blood, and that the only available source is her infant, to whom the abstraction of the requisite amount would be, without question, necessarily fatal. It may be contended that in this instance an essential element is absent, namely, that of mutual danger and the necessary forfeiture of both the lives, if one should not be sacrificed. Let us modify the situation but slightly by supposing them to be famishing castaways in mid-ocean, and that the parent sacrifices her child for her own sustenance. Then, indeed, the right of the mother to kill her offspring with the object of saving her own and, in her estimation, the more valuable life, must be regarded as at least as well founded as is that of the mother who demands the destruction of the child within her womb to free her from the fatal consequences of her voluntary act. A parallel contingency in real life occurred recently which resulted in the trial of two men for the murder of their companion. They were starving at sea in an open boat, and to prolong their own lives by drinking his blood, they hastened, by a few minutes, the death of an expiring boy by cutting his throat. After a most exhaustive trial, in which the case was argued by some of the most distinguished lawyers at the English bar, they were found guilty of wilful murder, and sentenced to suffer the extreme penalty of the law.

Of the many arguments which are advanced in favor of abortion, that which appeals most strongly to the sense of the community is the propriety of preserving, at any price, the life of the mother, who is frequently a loved wife, a valued friend, and the inestimable centre of a family circle. This is a plea which I should be the last to reject; but we must not permit any collateral considerations to blind us to the object of our investigation, namely, to determine the fullest measure of justice to which the mother and the fœtus are entitled, and the position of the physician in relation to the

performance of abortion. It is often contended that the undeveloped condition of the fœtus and its dependent and defenceless state detract from its claim to existence, but, if we exclude the element of birth, this is an argument which with equal propriety may be advanced against the rights of many adults, most children, and all infants. Mental deficiency might be pleaded with equal justice in defence of the murder of many of our fellow-creatures, as the imbecile, the insane, and even the comatose; but, far from extenuating the act, their condition only aggravates any violence which is offered to them; while monsters, the cyanotic, and the victims of arrested development, could be as justly destroyed on the ground of incomplete physical conformation as the immature fœtus.

By a modification of the arguments which are based upon the shifting and delusive assumption that abortion is sanctioned by being conducive to the benefit of society, it would not be difficult to defend a proposal for the stamping out of virulent epidemics, such as cholera and yellow fever, by the killing of those who are first stricken with the disease. Another defence of abortion is based upon the futile and deceptive comparison of the relative value of the lives of the mother and fœtus. This is but an effort to contrast the known with the unknown, for the natural development of this unborn being may possibly result in a career greater than any with which the old world or the new has ever yet been blessed, greater even than that of a Cæsar or a Socrates, an Aquinas or a Washington. It must be acknowledged, however, that the approximate value of human life is based upon its probable duration and the estimate of society. If we accept as a test the probable duration of life, we must decide in favor of the fœtus, for although the probabilities are greater in a child of ten years than in an unborn babe, the latter, owing to the low mortality in pregnancy and parturition, has a better prospect of life than any adult. Assuming that the estimation of society or of the friends be

accepted as a basis of judgment and action, almost invariably the mother's life will be that which the physician will be implored to preserve. It is possible, however, that in rare instances, as when a great inheritance, a title, or a dynasty depends upon a child's life, he may be commanded, at his peril, to sacrifice the mother and save the child. Law and religion are opposed equally to both the acts. Custom is more tolerant of the fœticide; but expediency, which is the sole sustainer of abortion, sometimes may vary its verdict, and declare itself favorable to the preservation of the more valued, even though the younger, life.

It may appear to the casual or superficial thinker that the mother, at least, is justified by the first law of nature to destroy, by her own action, the life of the fœtus, if she possess the requisite knowledge and skill; but we must remember the conditions which limit this natural right. The slayer must not provoke the affray or the "difficulty," and the Catholic doctrine adds the proviso that to justify the killing the victim must be an "unjust aggressor." Neither of these conditions is fulfilled, because the mother is generally a consenting and often an inciting party to the act of conception, and the proverbial innocence of the "unborn babe" makes aggressive injustice impossible. Therefore the mother has no right to destroy her offspring with the object of preserving her own life. The father has still less justification for interference, because, although it is his duty to protect his wife, he, at least, has been voluntarily accessory to the originating act, and his privileges are in other senses more limited than those of the mother.

We have considered the relations of all the individuals implicated in the abortion, with the exception of the physician, who must act either as a skilled agent or as a principal. If we regard him as an agent who has been engaged to perform a specific act, his rights and privileges cannot be in excess of those who employed him; and if, as I have endeavored to demonstrate, the mother or father have no right to

destroy or to engage another to destroy the fœtus, the physician must act upon his own responsibility, and we shall proceed to investigate his position. The duty of a physician may be summarized thus: He must perform every just and lawful act which is essential to the life and conducive to the physical welfare of the patient whose care he has undertaken. Let us consider for a moment the responsibilities which he incurs in producing abortion. He decides that the procedure is essential, notwithstanding the probability that, owing to the rarity of the operation, his experience may be defective, and consequently his judgment erroneous and misleading. Here I would remind you that in the practice of the more distinguished obstetricians, the proportion of intentional abortions appears to be inversely to their years, and it must be remembered also, that although the decision may occasionally be in the hands of an able and experienced physician, under existing conditions it is determined more frequently by the ordinary practitioner, who is often but poorly equipped for such a solemn responsibility. In addition, the case is decided not even by an honest, if ignorant, practitioner, but too frequently by the unreliable followers of one of the many "pathies" which help to swell the American death rate, or by the incapable and unconscionable quack. The physician undertakes an operation which is necessarily destructive to one human life, and, owing to its dangerous nature, most hazardous to another, and possibly, as in cases of multiple conception, the operation may result in the death of three, or even a greater number of human beings. Unless he permits his own judgment to be subordinated to the equally fallible human opinion of his employer, he voluntarily undertakes a deed sanctioned by no law, but always regarded, often perhaps too impassively, as a felony, aud punishable accordingly. Without any commission, and frequently prejudiced towards a certain view, he constitutes himself the judge of a court from which time admits of no appeal; before him a dumb and defenceless prisoner is arraigned for the in-

tent to inflict an injury of which it is unconscious; he ignores that impartiality so essential in an arbiter of life and death, and is simultaneously the judge and the counsel for the prosecution; he decides adversely to the accused, condemns him to the most frightful and painful death, and lastly, as the executioner of his own sentence, he sends an unborn fellow-being from a world he has never seen into that "Great Beyond" which the strong man and the wise man dread to enter even after the most prolonged and anxious consideration. In the saddest chapter of the saddest history, that of the Irish rebellion of 1798, one figure towers aloft by reason of his stature and his fiendish cruelty. His literally veracious epitaph ran thus:

> "Here lies that brutal Hempenstall,
> Judge, jury, gallows, hangman, all."

I cannot discern how he differed from the physician who produces abortion, except that Hempenstall held a commission from the King of England authorizing his brutal iniquities, he was maddened by his turbulent surroundings and excited by the inhuman antagonism which resulted from his victims being matured men, capable of resisting him, and of being possibly all that his education and his prejudices depicted them; while the physician has no warrant compelling him to perform the deed, his victim is a defenceless and unoffending fellow mortal; his surroundings and his teachings tend to calm deliberation and just conclusions; his duty is to preserve the life of his patient by every just and lawful act, and, mark you, all mankind who, formally or informally, come under his care, are equally his patients, the fœtus as well as the mother, and if he would not be a bravo, neither fear nor favor nor remuneration can ever justify the sacrifice of the life or interest of one patient for the pleasure or advantage of another. Finally, that great *dictum* which underlies all true religions, "Do no evil that good may follow," deprives him of every flimsy and inadequate plea suggested by that insolence of ignorance so essentially a human attri-

bute, reaching its highest development in the pursuit—here, it can hardly be regarded as a profession—which often, with the most inadequate preparation, arrogates to itself and has conferred upon it, by an otherwise rational public, the greatest worldly responsibility.

While personally repudiating all sympathy with abortion in any form, I shall conclude with the following suggestions, which may be justified by the principle that "new circumstances demand new laws." The prevalence of abortion as an established procedure in modern medicine, the freedom with which it is practised and the enthusiasm with which it is advocated by gentlemen of great professional influence in this city, some of whom I heard in public indignantly denounce other individuals, medical, lay, and clerical, because they conscientiously refused to assist or sanction the destruction of the embryo, are the circumstances which convince me that no existing enactment, either human or divine, can prevent many physicians from practising abortion in good faith, and consequently that some "new laws" are needed which shall tend to limit its application to the minimum, and to alleviate, in the juridical sense at least, the repugnant act of abortion into "justifiable fœticide." Such a restriction, while affording every advantage compatible with justice to the mother, should insure to the fœtus every possible security by adequate investigation and representation, in accordance with established legal procedure. Every court or tribunal consists of three essential elements,—the plaintiff, the defendant, and the judge. The two first named are frequently permitted to "appear" by proxy, and generally their interests are guarded by skilled advocates. In criminal law, where a fourth element is introduced in the person of the executioner, the greatest precautions are exercised to secure for the most notorious malefactor every advantage which can accrue from thorough investigation, the admission of favorable testimony, and the assistance of able lawyers, who are frequently supplied by the authorities. Even when

a cadaver is discovered, the State institutes a most exhaustive investigation in order to determine the circumstances connected with the death, and the climax is reached when the Law, having executed a criminal, makes a formal inquiry into the cause of his death!

If such care be bestowed upon the elucidation of the causes of death and the equitable trial of abandoned criminals, it is natural that we should inquire if the State does not neglect its duty by permitting this notorious and daily destruction of human life without a rigid investigation, and the assertion of its unquestionable right to veto or to sanction each case according to its merits. If the authorities could be awakened to the necessity of establishing a tribunal for the purpose of restraining those practitioners who are not deterred by ethical considerations or religious scruples, its construction should be an easy matter for the practical legislator. According to precedent, it might consist of the presiding officer or judge, a physician of the highest professional probity and juridical reputation; an able practitioner as the counsel or defendant of the fœtus, the parent being represented by her personal medical attendant, and the fourth member of the court would be the executive officer. That such an officer as a State abortionist should be appointed is apparent, owing to the many instances in which no power could compel the attending physican to perform so repugnant an operation; while, even if he were willing to undertake it, his opportunities might not afford him the essential skill and experience. It would hardly be in keeping with that rigid impartiality so desirable in a presiding officer if, as the executioner of his own mandate, he were to perform an operation for which he would necessarily be remunerated; neither would it be in keeping with the function of the physician to whom we have alluded as the representative or defender of the fœtus to destroy the life of his client. With such a tribunal the operation would be shorn of some of its most objectionable features.

A restraint would be imposed upon those who regard their personal judgment as all-sufficient and final, if the practitioner were compelled to report to the executive those cases in which he considered abortion essential; the members of the noblest profession would be protected from a degrading demand to commit a felony; the popular opinion which ascribes to the medical profession the odium of encouraging abortion, owing to the levity with which physicians frequently discuss the subject, would be exploded; without the sacrifice of dignity or emolument, the physician would transfer to the strong arm of the law a great responsibility; without any infringement of her liberty, the patient would have the advantage of supervision and treatment by skilful and experienced physicians in consultation with her own attendant; and, finally, two classes of criminal abortion, which occur but too often and without attempt at concealment, would be eliminated.

The first is that in which the patient, anxious to evade the trials of maternity, imposes upon the inexperienced or careless physician by simulating the alarming symptoms of pernicious pregnancy until he is persuaded that abortion alone can preserve her life; in the other class, the practitioner, more or less above suspicion, justifies or cloaks a criminal abortion by averring that the evacuation of the womb is essential. An instance illustrative of one or other of these classes was disclosed in the course of a notorious divorce trial which recently scandalized this city. The attending physicians deposed that the abortion was essential, while other witnesses asserted that it was performed to avoid the expense and inconvenience of motherhood. A practical step towards the suppression of, at least, some forms of fœticide, would be inaugurated by rendering its performance more dangerous to those abandoned wretches who abuse the most precious human instinct, dishonor the fair fame of medicine, and defile the national reputation by their dastardly and incredible outrages against the sanctity of life.

DISCUSSION.

Dr. L. F. Warner said that the paper did not admit of criticism, but deserved candid and unqualified approval. He believed that no woman ever used means for procuring the death and expulsion of the fœtus without realizing that it was a moral wrong, and that every woman who did or consented to the act thereby lowered herself morally beyond recall.

Dr. W. Symington Brown remarked that the paper was an admirably drawn up special plea, which might have done credit to a lawyer. Dr. Kelly had set out by disclaiming all sectarian bias; but the fact was that the whole plea was based on the authority of the Church, and, like many similar arguments, could not hold water. He was aware that this was not the place to discuss such a question, and he did not deny that the Church had a right to dictate to its own members; but he emphatically denied its right to dictate to him. He thought that Dr. Warner had failed to grasp the real aim of the paper, which was not directed against *criminal* abortion, but against abortion itself under all possible circumstances. The mere fact that the word "criminal" is prefixed shows that there must be a kind which is justifiable. The physician, after consultation, is the proper party to decide what is best to be done, and the patient has a right to veto his decision. For his part, he only recognized one rule to be governed by, and that is, the welfare of his patient. He would like to ask Dr. K. how his argument would apply in a case of extra-uterine pregnancy? During the early months, a current of electricity suffices to destroy the fœtus without injury to the mother. Is not a child alive outside as much as inside the uterus? Yet no conscientious gynecologist scruples to kill the fœtus under these circumstances; and, in my opinion, he is fully justified in so doing, because the welfare of the patient demands it. Would the essayist allow both the mother and fœtus to die in order to save his own conscience? According to the tenets of the paper he would.

As regards the legal tribunal to the verdict of which Dr. K inclined, as a last resort, to refer cases of abortion, he would simply remind him that law is not infallible any more than medi-

cine, and that innocent men have been hung on circumstantial evidence. He hoped that this Society would not indorse the idea that it is wrong, *under all circumstances*, to produce abortion.

Dr. A. P. Clarke said that many women are depressed and nervous during gestation, and need the encouragement of their physician in order that they may withstand the temptation to secure a miscarriage. To treat these patients judiciously, so as to tide them safely over this critical period of depression, is the duty of the physician. Dr. Clarke believes that criminal abortions are less frequent than formerly.

Dr. Chas. R. Whitcomb thought that the physician was, to a certain extent, the custodian of the public morals, and should not assume to act as judge of life and death. He agreed with the conclusions of Dr. Kelly's paper, and did not consider abortion justifiable under any circumstances.

Dr. E. W. Cushing said that the arguments of the speaker were very old, and extremely well wrought out, as some of the acutest minds of the Catholic Church had been at work on the subject for centuries. The syllogism appeared perfect, and the conclusion inevitable; yet, in reality, the reasoning is somewhat sophistical, for one of the premises on which it rests is shaky. In substance, the writer says that killing an infant to save the life of the mother is homicide; well, so it is. Moreover, that the only justifiable homicide is under certain circumstances which he describes, viz., self-defence, command of civil authority, etc. Here is the weak point; where is his authority for excluding another category, *i. e.*, where the physician fulfils the unwritten law of civilized life and organized society, in taking a fœtal life to save another, the mother's, just as a General may send one man or body of men to certain death in order to save other and more important parts of his army?

Now, either we have to squarely admit the authority of the Roman Catholic Church to settle all matters of morals, or each man must help himself by the light of his conscience, guided by the average opinion of his time and community, and by the concensus of the competent. Now, we of the medical profession are the competent, and the concensus on this question is overwhelmingly affirmative.

The Protestant churches have no opinion officially on this question, as on many others, where medicine and morals come so near together that the Catholic Church has seen fit to decide what is right and wrong. Let any one read Father Gury, or any of the ponderous Latin works on Roman-Catholic moral theology, and he will find other points where modern society differs decidedly from the Church. Judged strictly thereby we should most of us be damned anyhow, and in settling these questions we have to do as Nelson did when he put his blind eye to the telescope to read the signal to retreat, and, continuing the fight at his own risk, saved the battle and his own neck.

No one abhors criminal abortion more than I do; and I know that Dr. Kelly's Catholic friends will, in a generation or two, have the majority side of this whole question; for what with frequent abortions, and the studied prevention of conception, equally reprobated by the Catholic Church, the Catholic birth-rate hereabouts is six to one of the Protestant, without counting the fact that every twelfth marriage in New England ends in a divorce, nearly all of these divorces being among Protestants. So that in a few generations New England will be a strong Catholic country, like Belgium. Now, however, this is not the case, and neither our civil organization nor our professional duties can be subjected to rules which, however logically they are worked out by men who never had any wives nor children, can be brought to a *reductio ad absurdum*, as here to-day, where Dr. Kelly maintains that it is wrong to kill a small extra-uterine fœtus by electricity, even when by not doing so we know that the child is nearly sure to die, and the mother is only saved, by exception, in rare cases.

In regard to the laws making every procurement of abortion a criminal matter, it is in the interest of the mother, primarily, that they are passed and enforced; for the legislators and courts do not in practice hold that the life of the mother must be sacrificed or greatly endangered to save that of the fœtus.

In regard, however, to abortion, it is evident that something must be done to check the most crying outrage and evil of our civilization, and any way in which physicians can help educate the community to a proper sense of the gravity and danger of the act or process of abortion should be welcomed.

Dr. Cushing did not believe that special courts could be established or worked, but would favor a regulation providing that in all cases requiring abortion or craniotomy the medical examiner of the district must be notified, and made a consultant, or at least exactly informed as to the necessity for the operation. In cases where the emergency does not admit of even a few hours' delay—and they are few—a formal notification should be required within twelve hours; in fact, the whole matter should be surrounded with the formality due where the life of a human being is involved. Until such legislation is procurable, it ought to be the first and plainest duty of every physician proposing to kill a fœtus to get the best medical advice available, in consultation, and to remember, in cases requiring craniotomy, how successful the Cæsarean section has become in these modern times.

Dr. H. C. White said that to every medical man there comes a supreme moment when he is above the mandates of Church or State, and must act upon his own responsibility, according to the best light that he has. Under these conditions, how much less wrong is it to allow two lives to be lost than to save the more valuable one by sacrificing the life of an unborn and perhaps not viable fœtus? He said that abortion and craniotomy should not be performed until the best available counsel had been consulted, but that, under circumstances where such aid could not be secured, he need not hesitate to sacrifice the life of the fœtus if he considered that unfortunate step necessary to save the life of the mother.

The President said that he had listened to the paper and its discussion with more than ordinary interest. On his own part he would be very glad to accept the views of the writer, since it saved the assumption of a grave personal responsibility, and reduced the question to a formalistic one. In the early days of the Church, when medical learning was, at the best, very imperfect, and the induction of abortion, or miscarriage, was followed by most grave dangers to the mother, the wisdom of the measure to save the life of one at the cost of that of another was a very doubtful expedient; and it was very likely safer to trust to nature. He did not understand that there was anything in the creed of the mother Church to prevent the saving of one life if it was evident

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In regard to the laws making every procurement of abortion a criminal matter, it is in the interest of the mother, primarily, that they are passed and enforced; for the legislators and courts do not in practice hold that the life of the mother must be sacrificed or greatly endangered to save that of the fœtus.

In regard, however, to abortion, it is evident that something must be done to check the most crying outrage and evil of our civilization, and any way in which physicians can help educate the community to a proper sense of the gravity and danger of the act or process of abortion should be welcomed.

Dr. Cushing did not believe that special courts could be established or worked, but would favor a regulation providing that in all cases requiring abortion or craniotomy the medical examiner of the district must be notified, and made a consultant, or at least exactly informed as to the necessity for the operation. In cases where the emergency does not admit of even a few hours' delay—and they are few—a formal notification should be required within twelve hours; in fact, the whole matter should be surrounded with the formality due where the life of a human being is involved. Until such legislation is procurable, it ought to be the first and plainest duty of every physician proposing to kill a fœtus to get the best medical advice available, in consultation, and to remember, in cases requiring craniotomy, how successful the Cæsarean section has become in these modern times.

Dr. H. C. White said that to every medical man there comes a supreme moment when he is above the mandates of Church or State, and must act upon his own responsibility, according to the best light that he has. Under these conditions, how much less wrong is it to allow two lives to be lost than to save the more valuable one by sacrificing the life of an unborn and perhaps not viable fœtus? He said that abortion and craniotomy should not be performed until the best available counsel had been consulted, but that, under circumstances where such aid could not be secured, he need not hesitate to sacrifice the life of the fœtus if he considered that unfortunate step necessary to save the life of the mother.

The President said that he had listened to the paper and its discussion with more than ordinary interest. On his own part he would be very glad to accept the views of the writer, since it saved the assumption of a grave personal responsibility, and reduced the question to a formalistic one. In the early days of the Church, when medical learning was, at the best, very imperfect, and the induction of abortion, or miscarriage, was followed by most grave dangers to the mother, the wisdom of the measure to save the life of one at the cost of that of another was a very doubtful expedient; and it was very likely safer to trust to nature. He did not understand that there was anything in the creed of the mother Church to prevent the saving of one life if it was evident

two must be sacrificed by non-interference. To the Catholic mother, the baptism of the child was an important rite, and he had often performed it under the direction of the clergy. Under certain conditions this simplified the question. He had, however, recently seen a case, in consultation, of vomiting in pregnancy where death followed a few days later from exhaustion. His advice of inducing abortion had not been accepted, as the family were Catholics, acting under the special direction of their clergyman. In a considerable number of instances he had induced abortion where he felt he had thereby saved the life of the mother. In a certain class of cases he should not feel justified in refusing his services.

The suggestion of the author of submitting all this class of cases to a Board of medical men, specially appointed, presented some manifest advantages. It would shift the responsibility from the general practitioner, and at the same time secure a much safer result to the patient by ensuring competent service. It would not be pleasant to contemplate such a "Board" of legally constituted executioners, and out of large cities would be impracticable. For good reason, it may be assumed abortions for the real purpose of saving the life of the mother are now rarely undertaken except after a careful consideration of the whole subject in consultation.

Dr. Kelly, in closing the discussion, said that he had but little to add to the paper which he had read. His desire was to induce the discussion of the subject, and he had succeeded most agreeably. He was pleased that so many of the speakers coincided with his views, and he would reiterate his convictions that the fœtus, although incapable of defending itself, should have extended to it the same degree of justice as that which every other individual receives from his fellow-men, and that it is unjust and unwise to impose upon the members, fallible or infallible, of the medical profession the duty, appalling upon reflection, of sentencing single-handed, and executing a living and sentient fellow-mortal. The expressions of the speakers indicating their belief that it is their duty to perform abortion in certain cases convinced him that they had not considered the subject in all its bearings, and he should be pleased if his paper induced them to reconsider their position of one-sided justice. Laws were not made for the

just man, but for those who are unrestrained by higher or nobler precepts. Freedom of action requires careful limitation, as without this the convictions of a madman could be quoted in extenuation of his freaks, and it would be illogical to permit the individual to indicate the line at which freedom of opinion should give place to legal or religious restraint. There are many acts, some of them most repugnant, which are perfectly legal, and yet no self-respecting man would think of performing them. Legality, necessity, and expediency do not afford sufficient excuse for acts which are naturally, initially, and fundamentally wrong. The declaration of our unalterable conviction of the probity of our acts may sometimes deceive or satisfy those in whose interests those acts are performed, but it does not appease the "still, small voice within."

HABITUAL CONSTIPATION IN WOMEN.

BY H. J. HARRIMAN, A.M., M.D.,

OF REVERE, MASS.

Read November 12, 1885.

One of the most frequent and obstinate troubles that the general practitioner is called upon to treat is habitual constipation. Even the large number of cases that are thus brought into notice are but a small part of those suffering from this cause, since a strange and unconquerable indifference to such a state keeps away all except those who are compelled to seek advice on account of other trouble, possibly the result of this state of the lower bowel. So frequently is this state associated with pelvic trouble, that the question naturally arises as to what relation habitual constipation bears to the diseases peculiar to women. To inquire into this relation and excite discussion on this practical question is the object of this paper.

Is this state a *cause*, an *effect*, or simply an *accompanying circumstance* of pelvic trouble? It seems to the writer that its relation is that of a cause, and it will be so treated. The physiological functions of the body are wonderfully interdependent. Not one can fail to act in its normal way without influencing, either directly or indirectly, the action of every other. This influence may be exerted through the general system, through a reflex nervous influence, or mechanically. In the case of failure to empty the lower bowel with normal frequency, we find the pernicious influences of such a state exerted in each of these three ways.

Of the constitutional effects of such a state malnutrition and spanæmia are generally prominent. This is

readily understood when we consider the function, or rather the perversion of function, of the lower bowel. The colon, especially the sigmoid flexure, is intended to act as a depot for the retention of fæces until it is convenient that they be discharged. Normally its absorbing power is limited. Its excretion consists of mucus and some odoriferous elements of the fæces. When, however, the excrement is retained for days, and it may be for weeks, the functions of this organ are so perverted as to give rise to pathological processes. The fluid elements are absorbed into the circulation, to be excreted by the other emunctories of the body; noxious gases are generated and reabsorbed, and there is created what might be called a vicious circle by the excretion and reabsorption of these noxious elements. An idea of the extent to which absorption goes on can be gained by comparing the bulk of fæces when a daily evacuation is gained, and the bulk when the bowels move but once or twice a week. In the latter case the amount is not much greater than in the former.

The effects of such a state can be seen in the slow toxæmia, which exerts a benumbing influence on the nervous system and depresses every function in the body. Many of the low, nervous manifestations which are usually characterized as reflex are due to this poisoned state of the blood. The strength fails; the appetite diminishes, and the tongue is foul; there is more or less constant headache, a want of mental power, a constant drowsiness unrelieved by sleep, and fatigue upon the slightest exertion. Sleep is not refreshing, but is disturbed by dreams and nightmares. The extremities are cold. Hypochondria and mental depression are common.

This state of the general health opens wide the door to all local troubles in the active organs of generation. The muscles and ligaments lose their tone, and yield readily to such injurious influences as tight-lacing, heavy clothing, and indiscretions at menstrual periods. The circulation is

slow and imperfect, owing to the defective performance of the functions of the heart and lungs; and ovulation and menstruation, which nature intended should be painless processes, become sources of anxiety and distress. Nearly all writers on diseases of women agree that flexions and versions of the uterus may be due, in part at least, to habitual constipation. In anterior displacements the primary influence of fæcal accumulation may be mechanical, whereby the uterus is forced forward upon the bladder, giving rise to troublesome bladder symptoms. In posterior displacements and prolapsus the evil is chiefly due to pressure from muscular action while straining at stool.

Thomas says: "Fæcal impaction may possibly produce flexion of the body, and frequently causes the cervix to bend sharply forward." Speaking of cervical flexion, he says: "It is generally produced by pressure directly exerted upon the uterus by tight clothing, which forces it against the concave surface of the vagina. This surface gives the impinging part a slant forward, and keeps it thus bent. Habitual constipation increases this vicious curve, and the two causes combined often result in an unmanageable form of the affection."

Fæcal impaction may cause, or at least aggravate, menorrhagia and metrorrhagia, by interfering with the portal circulation and producing congestion of the pelvic viscera. The author last quoted says: "My experience has furnished me with a number of cases in which fæcal impaction produced prolonged metrorrhagia, which was cured by its removal."

Leucorrhœa may be due to the same cause acting in the manner just stated.

It is no easy matter to discriminate closely between the nervous symptoms due to the constitutional influences of such a state, and those due simply to reflex influences. Vaso-motor disturbances are very frequent. Variations of temperature have also been noticed. Gastralgia, ovarian

neuralgia, together with various hysterical manifestations, are often the result of a loaded colon, and are cured by its relief.

Some of the pernicious influences of habitual constipation seem to be due to a mechanical influence simply, as has already been stated. When the sigmoid flexure and rectum are loaded and distended, the uterus is crowded forwards and dysuria results. The soft and pliable uterus of girlhood may be forced into abnormal positions and forms, necessitating surgical interference. In rare cases the transverse colon has become so loaded as to be dragged from its attachments. It then descends toward the pelvis, and thus increases the pressure on the organs of generation.

The causes of this unfortunate condition are not far to seek. The most of them are so well known as to render their repetition unnecessary. John Burne, writing in 1840, said that constipation was due more to indifference to the act of defecation than to any other cause. The experience of the profession to-day will, I think, verify this opinion. This cause, together with false modesty, indolent habits, vicious styles of dress, and ignorance of hygiene, are fully appreciated by medical men. There are, however, in addition to these, certain causes arising from the anatomical structure and physiological functions of women which render them peculiarly liable to troubles of this nature. At every menstrual period the uterus and ovaries are enlarged and tender, and press, to a greater or less extent, upon the rectum. The act of defecation produces pressure upon these sensitive organs, and renders the act a painful one, and thus leads to neglect of this function. It is said that constipation is more prevalent in this country than in England, on account of the fact that our comparatively dry climate favors the removal of the fluids of the body by evaporation, and thus diminishes the volume of excrementitious matter. However this may be, we know that a withdrawal of the fluid elements of the blood tends to

foster if not to produce this condition. This is shown by the influence which lactation exerts, whereby defecation is diminished in frequency.

The influences of frequently recurring pregnancies are unfortunate. During gestation the uterus presses upon the colon and sigmoid flexure, and interferes with their normal action. The extreme stretching of the abdominal muscles weakens them, and thus renders almost useless these important auxiliaries in emptying the lower bowel. In some cases, where many children are born, the abdominal muscles may become so relaxed that the impregnated uterus forms a pendulous mass in front of the *os pubis*. The great pressure to which the rectum and colon are subjected during labor exerts a paralyzing influence upon the muscle of the bowel. In addition to this, the relaxed state of the pelvic viscera following labor offers a diminished resistance to the great distension of the lower bowel which is so often discovered in cases of long-standing constipation.

The nervous state at the climacteric, with its fugitive abdominal pains and state of apprehension, causes women to dread and avoid any act which may seem to increase their distress. This leads them to neglect entirely or to slight the function of defecation.

Such are some of the causes and effects of this common trouble. It has seemed to the writer that in these days when local treatment of the uterus, both medical and surgical, is so popular, the attention of the profession might with advantage be directed to this state, and that more careful attention to the condition of the *primæ viæ* and general health would render the success of local treatment more certain and satisfactory.

DISCUSSION.

Dr. Warner said that the condition of the bowels should be an important consideration in the treatment of all cases. Generally

they will be found constipated, but careful attention to secure regular and full evacuations will often secure better results than any local treatment. Whatever success he had had in treating the diseases peculiar to women was due to constitutional rather than local treatment. Dr. Warner mentioned a case which he had once examined for pelvic trouble, where he found the rectum greatly distended by fæces. The patient said that such could not be the case, as she had suffered from diarrhœa for several days. It proved that a canal had been formed through the fæcal mass, through which the diarrhœal discharges had taken place. The speaker had used for years, with great success, the following pill in cases of habitual constipation: R. Pil. hydrarg., grs. iii; ext. hyoscyamus and ext. colocynth, aa, gr. i.

Dr. Wm. G. Wheeler mentioned the case of a school teacher who presented herself for treatment and stated that her bowels were regular. Treatment was carried out for some time without any improvement. More careful inquiry in regard to the state of the bowels revealed the fact that they "moved regularly once a month."

Dr. Marcy mentioned a case at Block Island in which thirty-one days passed without an evacuation of the bowels.

Dr. W. Symington Brown related a recent experience with a female patient 73 years old, to whom he was called on account of colic, and found that she had not defecated for five weeks. A copious injection of lukewarm water and glycerine relieved the "colic."

TREATMENT OF CONSTIPATION.

BY HENRY M. FIELD, M.D.,

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Read May 20, 1886.

THE physiological resources—or, better still, the resources answering to physiological indication—which the physician has at his command for the relief and cure of chronic constipation, may, for purposes of analysis and classification, be referred to three subdivisions.

First, chronic constipation is quite often habitual constipation, and is to be most effectually combatted by systematic attention to the demands of nature in a periodic evacuation of the bowels. Success along this line involves exceptional intelligence, and resolution, and confidence, on the part of the patient. The poet Cowper has well expressed the difference of task in the formation of a habit and reformation in the stanza—

> "Habits are soon assumed; but when we strive
> To strip them off, 't is being flayed alive!"

It is far easier to swallow an occasional or a frequent pill than it is to adopt the system required for the removal of a bad habit in respect of constipation; and the patient, whose interest and confidence can be enlisted at first, too often loses faith in herself or the system, and, indeed, in the doctor. The young woman who has been so badly trained in her maternal home—and cases of this kind, throughout our best families even, are innumerable—that she has no other notion of the natural functions of the bowels than that response is to be made only to an emphatic call, an experience which may happen once in three or four days, or once a week, or less often, and who receives as a new revelation the statement of her physician that there should be alvine evacuation

daily, *at a regular hour*, and the most rigid system observed in this particular, has no light occupation before her in an effort to inaugurate reform after so many years of inattention and irregularity. But such task has been repeatedly accomplished upon the condition of a fairly good constitution, of certain measures chiefly dietetic and hygienic, of help, and of determined perseverance; and constipation thus cured is effectually and permanently cured.

The patient is to be instructed to select that hour of the day best in consonance with previous habits and least liable to interruption,* and invariably, as the hour comes round, to make an effort at stool, even though there be no solicitation, and notwithstanding there should be frequent unsuccess. So inevitably is man the creature of habit in every realm of his being, that the patient who invariably and resolutely attempts to perform any physiological function at a stated hour every day, will very surely, after a time, carry out his purpose; and the more especially in the present instance if he have every assistance from a carefully adapted regimen. Of course, any physiological law whatever must have intelligent interpretation; and allowance must be made for occasional departure from the usual standard. There are patients who have excellent health upon the basis of a regular movement of the bowels once in forty-eight hours; and my preceptor, Dr. Peaslee, used to report the case, observed in one of his families, where both husband and wife, then arrived at old age, had each been accustomed for many years, if not through life, to evacuate the bowels only once in nine days! It is the principle of regularity that is to be insisted upon; and a single occasion of failure or neglect, in an individual whose bad habit of constipation had been largely corrected, may cause a serious relapse into the old and depraved method, or lack of method, of life.

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* *The hour best in consonance with previous habits, etc.* Not necessarily at early morning hour, although such is doubtless the hour observed by the majority of those who have established a habit of regularity. A short-sighted effort to force a particular hour upon a patient, who had individual reasons for the selection of some other period of the day, has been sufficient to bring discouragement and failure in some instances known to the writer.

Details can hardly be expected from a paper which is confessedly but fragmentary and suggestive; it is to be understood that the *regimen* which is to assist the patient in the formation of a new habit shall receive the largest construction and be the object of a special application in every case. Whatever best offers assistance, whether from the department of hygiene or dietetics, is to be laid under contribution. Such appliances as the electric battery, the electric belt, localized massage, kneading of the bowels, etc., have a high and, indeed, an essential value in some instances.

But all cases of habitual constipation, as already intimated, are not susceptible of cure by the scheme of the formation of a new and correct habit; and this for various reasons; probably those cured and capable of cure, at least as found in adult life, are quite exceptional. The patient cannot and will not persevere in the necessary effort; the bowels, long used to overdistension and torpor, will not respond to the most positive of alimentive stimuli; help must be had from medicine, and this medicine drawn from the class of cathartics. What is a cathartic? I have frequently found occasion to say that the definition of anything pertaining to special therapeutics must squarely meet three conditions, if it is to be depended upon to convey the requisite information: it must be intelligible, and concise, and comprehensive. Judged by such standard, I know not where, in any of all the books devoted to therapeutics, we shall find a satisfactory definition of cathartic. Fothergill approaches the requirement of the case, and yet his terms are not quite free from fault. The following, therefore, is proposed for approval or criticism: A cathartic is an agent or agency which increases both peristalsis and intestinal secretion—either element of action, ordinarily, being prominent according to the material used—with result of provoking preternaturally free and frequent evacuation of the bowels.

There is no need to remind you of recent physiological experiments which have established the fact that every

agent which acts cathartically, even though the influence be of that mild degree recognized as laxative, does so by procuring both hypersecretion and increase of contractility. One agent acts chiefly on the glandular structure, and the stools will be watery; another acts mostly through energized peristalsis, and the dejections are feculent, as with Epsom salts in the former case, and senna and aloes in the latter. There is one purgative, and perhaps only one, catharsis from which appears to present equivalent of action, viz., castor oil; a consideration which, together with the conjoined fact of nearly equable distribution of influence throughout the entire intestinal tract, renders this offensive medicament too often essential to the physician. With an occasional laxative in an occasional subject, energized contractility may be so little pronounced that the serous effusion evoked may remain in the bowel—unless reabsorbed — until some peristaltic is administered to procure its evacuation. But none the less is it true physiologically that the two elements specified always inhere to cathartic medication, and, in vaiable degrees, are always present in the operation of a cathartic remedy; and the recognition of this principle is essential to the successful employment of this class of materials.

Again, cathartics vary materially in their action, regionally considered; *e. g.*, senna acts chiefly on the small intestines and aloes on the lower bowel. Some, like jalap, and especially elaterium, act so high up as, frequently, to involve the stomach in the irritation produced and occasion nausea, and even vomiting. It should be borne in mind that the selection of a cathartic, with respect of its operation cathartically upon the small or the large bowels, must have a very important bearing upon the alimentation and nutrition of the patient; for a cathartic which acts energetically upon the upper bowel and so sweeps it of nutritive material upon which the energies of digestion have been already expended, and which is *in situ* and in process of and for assimilation,

depresses the patient far more seriously than does the emetic, which simply evacuates the stomach of undigested or indigestible food, while, *per contra*, the other purgative, which gives its force only to the larger bowel, can bring away little more than residual and excrementitious matter.

Still another fact must receive the attention of the physician who expects to employ a cathartic safely and effectively. Some purgative materials exert an influence, near or remote as concerns other organs, of which it is not practicable to take account in any definition of catharsis. In addition to modified action in the function of muscular and glandular structures, rhubarb and magnesia, prominently, effect important changes in the morbid condition of the mucosa of the intestine; and the fact that mercury is indicated in certain functional disturbances of the liver, and that aloes is contraindicated in morbid lesion of the rectum and uterus—familiar to every physician—are sufficient illustrations of the principle which we would emphasize.

Each subject of chronic constipation, requiring help from cathartic medication, must be regarded as a special problem, and, as it were, to be carefully solved before effectual aid can be afforded. An attempt to apply the methods of a routine practice will quite surely bring disaster or disappointment. The physiological characteristics of the prominent cathartics being already understood, it is now to be determined what are the individual peculiarities of the patient who presents himself for treatment. Is the constipation to be traced to inertia of muscle? and is this located chiefly in the large or small bowel? Or, again, is the prominent defect referable to a generally defective secretion from the glandular apparatus, or perhaps the entire canal? If it is that great gland, the liver, without the normal working of which no important task of either stomach or bowels can be healthily performed, if it is the liver that is at fault, it should go without saying that no therapeutic measures directed against constipation can be really remedial which

do not ensure the return of the bile, in proper quantity and quality, to the intestine. The researches of Rutherford, in particular, among recent physiologists, have provided us with new materials for service in this direction; but all the negative conclusions of all the physiologists from the time of Bennett have not availed to release the clinical physician from primary, if not inevitable, dependence upon mercury, in all conditions which unmistakably indicate recourse to a cholagogue.

If it is a weak and anæmic woman, whose symptoms point to torpor located in the small intestine, it will be a difficult task so to adjust medication as to restore activity, procure systematic evacuation, and yet not seriously to deplete. On the other hand, the individual who habitually over-eats, and who is consequently plethoric and perhaps bilious and constipated, will, in addition to a timely mercurial, find an admirable resource in the frequent use of the mildly saline cathartic waters, such as hunyadi, etc., so popular now-a-days; popular, doubtless, because their special role has come to be so generally recognized by the large class requiring such intervention. At the same time, it may be questioned whether the practice of the Roman epicure, in the employment of the emetic, as Seneca gives it—"They vomited that they might eat, and they eat that they might vomit," was not more physiological, as it was surely more direct in its purpose and results.

Probably no one material belonging strictly to the class of purgatives is so valuable to the physician, in the treatment of chronic constipation, as is nux vomica, classified elsewhere; and because, whatever other element may be present, a deficient tonicity is quite sure to complicate the worst cases of this affection. Nux vomica is the great neurotic energizer of digestion; it is to the nervous element in digestion what pepsin is as a catalytic, and it is the great peristaltic. Many cases can be successfully treated without help of other medicine than nux vomica, through depend-

ence upon the measures specified in the first section of this paper. Still further, the consideration that nux vomica has much of the stomachic properties of the simple bitter, combined with the component power of quinia, renders it the more valuable in such application. Again, nux vomica is valuable because the energy for a specifically peristaltic cathartic is much enhanced by its combination; so that, *e. g.*, the fraction of a grain of aloes may prove as effective in union with nux vomica as would a large integral dose of aloes alone.

Once more, the elimination, by the pharmaceutical chemist, of the active principles of aloes is a fact of much importance in the treatment of habitual constipation; so far, at least, as aloetics are applicable. Thereby much greater concentration is secured, and not this alone, but the essential oil, which is largely responsible for the nauseous smell and taste of aloes, is avoided, and it is no longer obligatory upon the physican, in his offer of a purgative, to present a bulky and offensive medicament. A parvule constituted of aloin and nux vomica, of each gr. $\frac{1}{3}$; or of aloin, gr. $\frac{1}{3}$, strychnia sulphate, gr. $\frac{1}{30}$, with addition of gr. i extract of hyoscyamus, to be taken after meals once or thrice daily *p. r. n.*, provides a resource more generally appropriate than perhaps any other that can be devised.

But aloetics have a wide and varied range of contraindication; it is pretty surely true, notwithstanding the assertion of some authorities to the contrary, that habitual dependence upon the smallest dose of aloes will gravely increase any active disease of either rectum or uterus. For the subject of chronic constipation, with complicating hæmorrhoids or metrorrhagia, or uterine inflammation, it is a difficult thing to find a substitute for the aloetic pill. But the introduction of cascara sagrada has rendered the task easier; and a pill made of nux vomica, with gr. i to ij ext. cascara sagrada, will sometimes meet the latter indication admirably.

It is an accepted statement with the therapeutic physiologist that physostigma increases secretion along the course of the alimentary canal; and, physiologically considered, there should be provided a mild laxative in a combination of nux vomica and physostigma, as setting in active operation the two essential factors of a cathartic influence. At all events, physostigma introduced into the aperient pill should meet a corresponding indication, as respects the glandular structure of the bowel, with nux vomica in its action upon the muscular coat. From my own limited clinical experience with the former remedy, I have failed thus far to be satisfied of this fact; but in the subject of chronic constipation, with prevalently dry dejections, it would receive the sanction of the authorities to combine a fraction of a grain of physostigma with the ingredients of the aperient pill.

Finally, idiosyncrasy is the occasion of much concern in the systematic and habitual use of cathartic remedies. It is doubtful if individual peculiarities assert themselves more arbitrarily in reference to neurotic remedies than in such employment of cathartics. If the patient is a female, and especially if she has been long pampered by habits of self-indulgence and luxurious living, the case must be very carefully studied upon its own merits and demerits, or the physician will quite surely go wrong. The selection of remedies having been made, and their apportionment decided upon, it is well that the patient should understand that no two cases of constipation ever required exactly the same treatment, and that quite likely there must be repeated trial and modification of the measure proposed, and a report to the physician before an exact adaptation can be made in the present instance. Large experience does not always bring confidence; a large experience in the treatment of chronic constipation rather brings distrust, *i. e.*, to the physician; and it is right that the patient should, at the start, be imbued with a measure of this distrust and acquainted with the reasons for it, alike in justice to the doctor, the system, and

himself. Many patients will not meet the inevitable conditions — they soon get discouraged, or are satisfied with partial results; but when the physician can secure such co-operation, it is assuredly alone his fault if the treatment is not at last reduced to successful terms.

There are, however, some general facts in the employment of special cathartic materials, of which the following must serve as illustrations; and the more of such the practitioner may have at command the less often will he commit a deplorable error: —

1. The salines do not commonly agree with the aged — they find them too chilling; and a dose of Epsom salts, which may operate very kindly upon the young and middle-aged and vigorous, may bring serious disaster to the old man or old woman. A sudden depression of vital energy and the function of calorification thus produced, together with other favoring circumstances, have more than once precipitated the subject into a fatal pneumonia.

2. All cathartics are apt to be attended with colicky complications when given to a woman at the epoch of the menopause; and especial combination at such time, as with carminatives, should be directed against this painful action. Some of the text-books or lectures used to report the case of a young doctor who was dismissed with contumely from a prominent family, upon which he had chiefly depended for the advance of his fortune, because of offense given to the alimentary canal of a matron, through neglect of this precaution.

3. The common domestic cathartic, senna, should never be prescribed to the subject of cumulative constipation or of impacted fæces; if there be anything answerable to a fæcal plug formed in the course of the small intestine or near the valve, on either side, such a peristaltic cathartic as senna will infallibly occasion serious and even alarming colic before evacuation can be accomplished; and the same restric-

tion applies to a similar use of an integral dose, as calomel.*

4. And to make affirmative provision for the subject of the last restriction, in a case of impacted constipation, when it is to be presumed the bowels are more or less distended with hard, dry, knotty, scybalous masses (and the more imperatively if there be suspicion of complicating typhlitis or perityphlitis), nothing works so safely and so well as Epsom salts, possibly energized with minute doses of tart. emetic, gr. $\frac{1}{16}$ to $\frac{1}{12}$. Or if it be desirable to apply a cautious peristaltic stimulant in this condition, or in whatever condition declares absence of organic contractility in the bowels, nothing else can be so direct in operation as gr. $\frac{1}{40}$ sulphate strychnia, inserted once or twice in the twenty-four hours in the areolar tissue of the abdominal wall.

5. There is apparent perplexity in providing cathartic medication, whether on occasions of temporary or habitual constipation, for the subject of a prevalent uterine hæmorrhage—*i. e.*, menorrhagia or metrorrhagia. Of course, aloetics are absolutely contraindicated, and senna and cascara no less absolutely; unless, indeed, in the exceptional instance where such a remedy as ergot is required. But there is a cathartic, or laxative cathartic, which deservedly has the reputation of exerting somewhat of inhibitory influence upon hæmorrhage from the womb, viz., cream of tartar. It would be hard to name another which, in its action upon the bowels, arouses so little of peristalsis; and it is not possible that cream of tartar, in any degree of action, should stimulate uterine muscles to contraction; while its tendency to reduce temperature, and especially to lower blood pressure, should work favorably for the arrest of hæmorrhage from whatever cause.

The last section of our subject contemplates, if not the

* An infusion of senna may, however, be administered as enema when the torpor and distension are mainly located in the large bowel, both safely and effectually. The excitant influence of senna over the organic muscular fibre of bladder, and uterus also, was perhaps more familiar to physicians of an older school than to those of the present day.

cure of habitual constipation, at least an escape from its discomforts and injurious influence upon health, by the systematic use of water-enemata; but its discussion must be postponed for want of time. It may be said, however, in closing, that loose and erroneous notions prevail to an extent among the profession even respecting the value and the consequences of this measure of relief. The rectal syringe, like the uterine pessary, may do incalculable mischief; suitably, appropriately, strictly and intelligently controlled, it may be of incalculable benefit. In either instance, there must be selection of cases and considerate adaptation. In no other department of medical practice is the tyro in medicine more out of place, as well as the physician who gives but a passing thought to the condition for which he is called to prescribe.

DISCUSSION.

Dr. Z. Adams said that he could add but little to Dr. Field's excellent paper. Next to cultivating the habit of regular evacuations he regarded kneading the bowels as the most pleasant and efficient means of relieving the constipation. Dr. Adams asked the opinion of the members in regard to the value of cascara sagrada.

Dr. Field considered cascara sagrada of value, and the solid extract as the most pleasant and efficient form of the remedy. It is a stimulant, and acts like senna, though it produces less peristalsis. In many cases of constipation in feeble infants he regards it as the only safe and proper remedy.

Dr. L. F. Warner considered the paper a valuable one, but found in it no reference to what he considered "nature's physic," *i. e.*, healthy bile. He thought that the secretion of the liver should be attended to in all cases, and that mercury in some form was indicated in the treatment of all cases of constipation. He attributed the action of some purgatives, like elaterium, which produce copious watery discharges, not to any specific action upon the glandular system of the intestinal tract, but simply to increased endosmosis and exosmosis.

Dr. Wm. G. Wheeler said that most of the agents for the relief of constipation were not new, but that the practical application of the remedies had been improved. Some of the agents formerly much used, but now practically discarded, such as cream of tartar, etc., are of great value. Idiosyncrasy is an element in the treatment of every case which should not be overlooked. Dr. Wheeler described a case of a lady who from childhood had had but one evacuation of the bowels each month. In this case enormous dilatation of the colon existed, but the condition was somewhat improved by the use of aloin, nux vomica, and careful attention to diet and habit.

Dr. W. Thornton Parker spoke of the custom of some tribes of American Indians of using frequent and powerful purgatives. The alarming prevalence of consumption among them is probably due to the debility resulting from such hypercatharsis. Tobacco seems to act as a laxative in many cases. Dr. Parker stated that tartrate of soda in effervescent form is a laxative the excellence of which is not fully appreciated. The triturates of calomel and ipecac are of great value, especially for children. The common American privy is the cause of many cases of constipation. They are at a distance from the house, are cold and inconvenient, and many women prefer to undergo the dangers and discomforts of constipation rather than endure the exposure incident to a visit to the privy.

Dr. W. O. Hunt said that the constipated habit was due primarily to a disregard of the calls of nature, so that the lower bowel in time became distended and failed to respond to the irritation of the fæcal mass. He had found the gluten suppositories, sold by the Health Food Co., of Boston, an efficient and agreeable agent in procuring an evacuation, and also in permanently relieving the constipation.

Dr. E. W. Cushing had used electricity in the form of the faradic current with advantage in the treatment of constipation. This agent is of special value in cases where the trouble is due to atony of the muscular elements of the bowels. The tight waist worn by girls and the belt used by boys are pernicious in their effects. They interfere with the function of the bowels by preventing the passage of the fæces along the ascending colon. This

interference may produce dilatation of the colon and thus cause a liability to typhlitis or perityphlitis. Suspenders are better and safer.

Dr. Parker did not think that the belt worn by men and boys could produce the ill effects described by Dr. Cushing. He had had experience in treating sailors, and did not find them peculiarly liable to constipation, although they invariably wore a belt, or at least trowsers which were tight at the waist.

Dr. Cushing, in reply, said that the belt or tight waist of the sailors does not constrict the abdomen, but that their trowsers are suspended from the hips. This would explain their freedom from the bad effects of the ordinary belt.

Dr. I. W. Starbird wished to bear hearty testimony to the value of cascara sagrada. He had used it with success in ninety-four cases, and considered it especially valuable in the treatment of children. In doses of fifteen drops of the fluid extract he had relieved cases in which natural evacuation had not occurred for six years.

RELATIONS OF CERTAIN BACTERIA TO PUERPERAL INFLAMMATIONS.

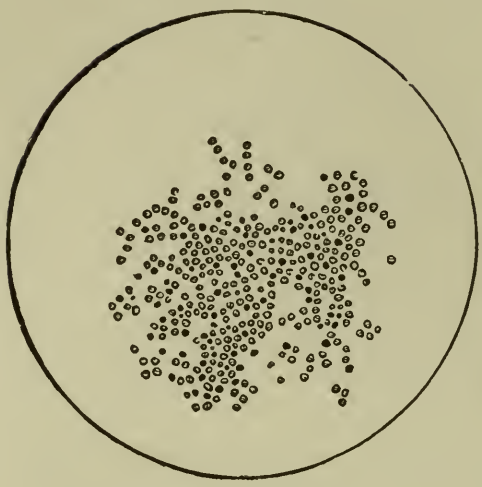
BY E. W. CUSHING, M.D.,

OF BOSTON, MASS.

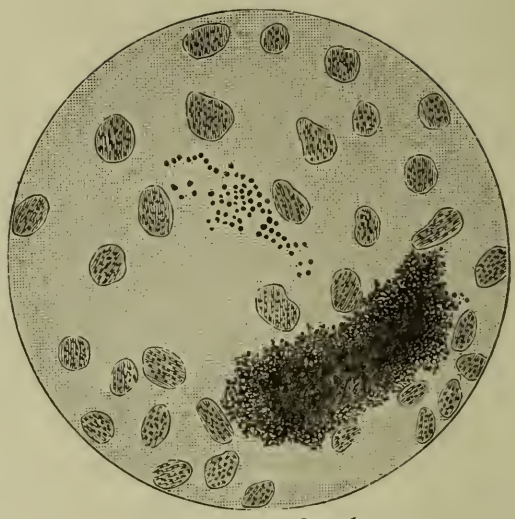
Read November 12, 1885.

It is with no little hesitation that I venture to offer here the results of some observations which I made last summer at Vienna, on the relations of bacteria to puerperal septic processes. It is very probable that the work has been better and more thoroughly done and more fully reported by others ; but I trust that the results of personal investigations, even if very limited, may be more acceptable here than elaborate abstracts of the work of others. Nevertheless, I must preface my observations by a short description of the bacteria which, thanks to the labors of Ogston, Rosenbach, and Passett, are called septic, in distinction from numerous other varieties which are either harmless to man, or, if they cause disease, yet do not induce suppuration, pyæmia, nor septicæmia.

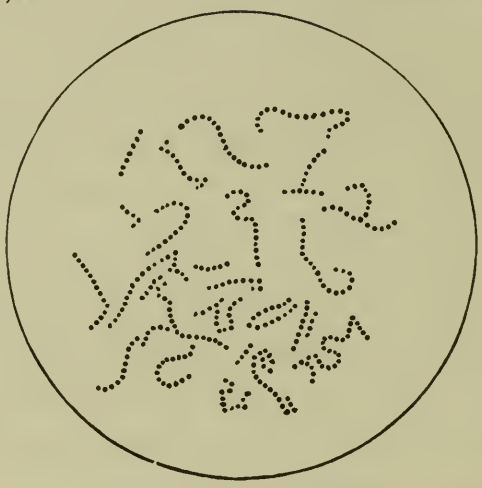
Of course, it has long been assumed by the disciples of Lister that infection of wounds is caused by germs, and on this base the whole fabric of antiseptic surgery has been built. But it is only recently that the strict rules and methods of Koch have been applied to proving the theory of Lister to be true by demonstration. I have not space here to say much concerning the nature and habits of these organisms. They are well described in the works of the above authors, and I subjoin a plate from Passett's recent work, showing the figures of germs as found in acute abscesses in man. That they must be considered as the causes of the suppuration has been shown by a most careful series



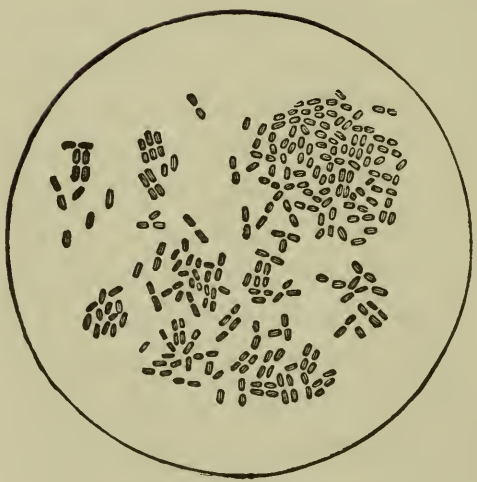
Passett, *Fig. a*, 1,600 x.



Passett, *Fig. b*, 1,600 x.



Passett, *Fig. c*, 1,600 x.



Passett, *Fig. d*, 1,600 x.

Fig. e, 1,600 x.

of experiments on the lines laid down by Koch, and by following his methods.

They are usually present either singly or together in acute suppurations. They can be bred in pure cultures for successive generations, using always a quantity so infinitesimal to sow each successive culture that it is certain that none of the original virus remains in the cultures.

From cultures many times removed from the original, inoculations in animals will produce the original disease, viz., acute abscess, or blood-poisoning, or both. In animals dying of disease thus induced, the original organisms and no others are found, and so the process can be carried on *ad infinitum.*

Without entering on the question of the relative importance of the work of different authors, or detracting from the great merit of Rosenbach in his original work in this matter, I quote the classifications of Passett with his plate.

Streptococcus.		
Staphylococcus	pyogenes	aureus.
"	"	albus.
"	"	citreus.
"	cereus	albus.
"	"	flavus.
Bacillus pyogenes fœtidus.		

NOTE TO EXPLAIN PASSETT'S FIGURES.

Passett, *Fig. a.*— Staph. pyog. aureus, on cover glass, seen in water; from Agar-plate 48 hours old.

" *Fig. b.*— Section of rabbit kidney. The rabbit died two and one-half days after infection of Staph. pyog. aureus in jugular vein, staph. seen interstitially and in tubules.

" *Fig. c.*— Streptococci of pus from gelatine culture, seen on cover glass in Canada balsam.

" *Fig. d.*— Bacill. pyog. fœtidus from gelatine culture.

" *Fig. e.*—Bac. pyog. fœt. in section through lung of guinea pig, which died twelve hours after injection of a gelatine culture of the b. p. fœt. into its jugular vein.

In all these figures the artist has doubled the original dimensions, thus giving about 1,600 diameters instead of 790 in Passett's plate.

As for the streptococcus, or chain germ, suffice it to say that no differences in form or manner of growing can be detected between those found in abscesses and those described by Fehleisen as found in, and bred from, cases of erysipelas. Also the chain germs described by Loffler as found in some cases of diphtheria are precisely similar.

They are all alike under the microscope, act alike with staining reagents, grow alike in gelatine, and have similar effects on animals when inoculated, while no one dares to try inoculations on man for fear of fatal results

The staphylococci, or cluster-of-grapes germs, are all alike when stained under the microscope, but can be divided as above by breeding them in gelatine, etc., on flat plates, so that each kind has a chance to grow and develop its color apart from the others. The last two kinds do not set up suppuration in animals, but are found in human pus, according to Passett, who kindly showed me his preparations in Munich.

The small round germs, or cocci, of which the chains in one form or the clusters in the other forms are composed, are about ·58 of a micrometre in diameter. Perhaps it will be easier to comprehend if I say that when magnified 800 times they look about as large as a period point of this print.

The bacilli pyogenes fœtidi, or foul-smelling rods, are about the same in width and two to three times as long. They are found in foul abscesses, and when bred in gelatine impart to it the bad smell, no matter through how many generations the cultures are carried. All of these multiply by fission or splitting in two, each part soon becoming as large and perfect as the parent. Allowing that under appropriate conditions each divides hourly, we have the well-known problem of geometrical progression, so that if at the end of three hours there are eight, at the end of twenty-four hours there will be sixteen and one-half millions, more or less, and in a week a number requiring over fifty figures to express it. As each one either excretes a poisonous mate-

rial, comparable for activity and deadliness to snake virus, or forms it from the substances on which it lives, it is no wonder that, if they fairly get into the fluids of the body and the general circulation, the mortality is terrible.

As a rule, they do not make the gelatine fluid in cultures, they grow at ordinary temperatures, and are not necessarily derived from previous suppurations. The last point is of immense importance, as no one can tell when he may get them on his fingers or instruments.

It might be assumed, as they grow so readily in all sorts of media and at all ordinary temperatures, and are extremely tenacious of life when dried, that they would be found independent of previous suppuration, and Passett has shown this by actual search.

In regard to their tenacity of life, Rosenbach states that old cultures of staphylococci, quite dry and black, on being moistened, were as active as ever, and as capable of setting up infection. There is reason for supposing that when once dry, these low germs can exist indefinitely with their evil powers latent but not destroyed. I said above that these organisms, or some of them, are usually found in abscesses. Practically, it might be said that they are always there, and they can be bred with ease and certainty from all *acute* suppurative processes. Still it is not claimed that suppuration cannot occur without their presence, for it has been shown that croton oil, even when most thoroughly sterilized, will produce suppuration. The method of showing this is to introduce under the skin of rabbits fine glass tubes hermetically sealed, containing croton oil. This is done with full antiseptic precautions, and when everything has healed, the tube is broken subcutaneously, and an abscess ensues. But the matter contained in the abscess has no germs in it, neither will it set up abscesses nor blood poisoning if inoculated into other animals.

With this very imperfect sketch, I will leave the subject of septic bacteria in general, to describe certain imperfect

observations which I have attempted, in order to ascertain whether the puerperal inflammations are caused by the same agencies as other suppurations and blood poisonings, or are distinct and *sui generis*.

The question is of importance, because such affections have been classified as a distinct disease, viz., "puerperal fever," supposed to be epidemic in the air, like smallpox, for instance, and to prevail in certain places and at certain seasons, owing to some mysterious epidemic influence.

During nearly three months of this year (1885), I endeavored to be present at the autopsies of all women who died in the General Hospital at Vienna of puerperal diseases, or after gynecological operations; and in septic cases, whenever practicable, I took advantage of the courtesy and guidance of Prof. Kundrat, and of his accomplished assistants, Drs. Paltauf and Kolisko, to examine the fluids and organs for bacteria. I wish to express my gratitude to these gentlemen, and may here call attention to the many advantages for pursuing practical work in bacteriology in the Pathological Institute in Vienna. By the energy of Prof. Kundrat, the accommodations have been recently much enlarged, and a room specially fitted up for bacteriology, where Dr. Paltauf, who speaks English, gives regular courses to physicians, besides which at least three other courses are given elsewhere in Vienna.

The great advantage of an immense choice of fresh material, learned instruction in pathology, and skilful guidance in the technique of bacteriology, all under one roof, is difficult to find elsewhere. Verily:

> "Es giebt nur eine Kaiserstadt
> Es giebt nur ein Wien,"

so far as concerns opportunity to employ all one's time profitably in the study of all, or various, branches of medicine. I do not wish, however, to detract from the great merits of Berlin as a place where each department of medi-

cine is carried to the highest degree of perfection possible, particularly the subjects of bacteriology, antiseptic surgery, and gynecology.

The advantages of Vienna, however, as a place for study, lie in the concentration of material, the arrangement of the courses, and the excellence of the teachers, and most of our countrymen studying abroad find that these advantages are sufficient to cause them to spend the greater part of their time there.

I approached the subject of puerperal fever, so-called, somewhat influenced or prejudiced by the opinions on that subject so ably set forth by Prof. Barker in his classical work, but was soon convinced that all the cases which I could examine, post-mortem, supported the view which I believe is usually held and taught in Germany and Austria, viz., that puerperal fever is the result of an invasion and multiplication of bacteria, arising from infection of the uterus or abraded vagina. Under this view, what is called septicæmia would be considered merely as a symptom of the rapid entrance into the circulation of poisonous products of bacteria.

As this paper is rather intended as a means of inducing a discussion of the subject, than as an attempt to dogmatize or strictly to prove anything, I shall first mention a few facts which seem to have some bearing on the question, and then I will briefly describe a very few cases, or autopsies, and show some microscopic specimens of bacteria as found in the secretions or fluids examined.

Of course, even assuming that puerperal fever is caused by bacteria, very little light is shed on the practical question of how it is "caught," unless the mode of infection can also be discovered. For it is perfectly conceivable that bacteria, or their spores, may be blown about as dust, and thus come in by an open window, and perhaps be inhaled, or be wafted into the vagina, and so fill for the scientific mind the place of the time-honored idea expressed by "catching cold."

Now so many cases occur where direct infection cannot

be shown, that this idea of infection by atmospheric germs has taken a strong hold on the profession and public, and is, of course, at the root of Listerism, spray, etc. It is too wide a question to discuss now whether there is much basis for this belief. It is certainly a comfortable doctrine, and it would shake the profession to its foundations if it were ever assumed by the doctors, and taught to the public, that for every unlucky case of puerperal fever and pyæmia some one were to blame for criminal carelessness; that in all such cases a diabolical coccus had hidden under a finger-nail or on a sponge or syringe, and had directly poisoned the patient. And yet, from my very imperfect observations of the natural history of the bacteria, found after death in such cases, I should always regard the theory of direct infection more probable than that of dry septic dust in the atmosphere, that is, in the general out-door atmosphere; and a contrast of the habits of the hospital assistants and students at Berlin and at Vienna merely strengthens this view. For, as I will shortly explain, it seems to me a sheer impossibility that the Vienna lying-in and gynecologic wards could be as free as they are from septic diseases, if the germs thereof could readily be carried about in the air at large.

In Berlin, the most extraordinary precautions are observed to prevent the introduction of any septic germs carried on the hands or even in the hair or clothing of those present at births or laparotomies; and, besides injunction as to cleanliness of hands, person, linen, etc., a most absolute promise is required of all proposing to be present as above, that they shall not go to any autopsies or pathological institute, nor visit septic cases. The spray is used very thoroughly at operations, and everything is done which could be suggested by the belief or knowledge that septic bacteria or their germs are abundant in the air and easily portable in the dry state.

If this were really and practically the case, however, it would hardly be possible or conceivable that the great Vienna hospital should be and remain practically free from

puerperal fever, and that the frequent laparotomies should show such good results as far as sepsis is concerned; for not only are the students present in the lying-in wards to be seen every forenoon at the autopsies, but the responsible assistants who perform the obstetric operations make it a rule to be present at the section of any case dying in their wards. And this is not all, for the chief assistant of each division gives every afternoon a practical course of obstetric operations on the cadaver; and with no protection, except a rubber cot on each forefinger, drags badly-corned babies through the pelvis of a very stale cadaver, or demonstrates the ghastly realities of craniotomy and decapitation. In an hour he may have to perform version on the living woman. Why does he not infect her? Practically he does not; of that there is little doubt, for the septic cases in the hospital do not originate there, but are sent in already in fever, to be delivered, after having been worked over outside, sometimes for several days, by midwives and doctors.

By the courtesy of Dr. Pritzl, First Assistant of the Clinic, I was enabled to watch pretty closely for cases of infection caused by assistants or students, and to observe the conscientious prophylaxis of the assistants. Although, as a system, it is theoretically very dangerous, yet practically no ill results seemed to arise. The assistants take a bath and change their clothes after their operative course on the cadaver; for the rest, safety is sought and found in *thoroughly cleaning and disinfecting the hands and wrists before making any and every vaginal examination*, using soap, water, sublimate or permanganate of potash, and nail brush, again and again, with what to scoffers seems damnable iteration.

Laparotomies are done without spray, by Prof. Braun, with the same assistants who have charge of the labors as well as of operative courses on the cadaver, and in presence of a class of one hundred or more, fresh from all sorts of wards, or from the Pathological Institute, seated in an amphitheatre, but not touching the patient or instruments.

Yet there is very little sepsis. Of the last fourteen laparotomies of the course, done in the first two weeks of July last, all recovered but one, who sank, without fever, after the removal of a huge sarcoma of the ovary. Of course, every conceivable precaution is used to disinfect the skin of the abdomen, and the hands, sponges, and instruments of the operators; but there seems to be no fear of dry germs in the atmosphere, and no reason to think that infection actually occurs in this way. In a case which I shall shortly describe, where sepsis and death followed the removal of a fibroid polyp of the uterus, I believe it probable that the infection came from some of the numerous students who made digital examination just before the operation commenced.

The fact that such immunity from septic infection exists, where assistants and special students are continually handling the cadaver, implies that thorough cleansing and disinfecting of the hands is a sufficient precaution, and, perhaps moreover, such disinfection would sometimes by accident be incomplete, that the bacteria found in ordinary cadavera (for, of course, those dying of septic maladies are not used for instruction) are not usually sufficient to set up puerperal or septic processes; and I think it probable that this may also be true, although, of course, it would be unjustifiable to attempt directly to prove it; for I found, as far as my observations went, that in puerperal cases there was regularly present one or the other of the above kinds of micrococci, each very definite, and breeding true in gelatine, viz., the streptococci or the staphylococci described by Rosenbach and Passett as the active agents in the infectious diseases of wounds, or the bacillus pyogenes fœtidus.

The process seemed to be an inoculation of the uterus or abraded vagina (or the fluids or parts of placenta retained) with one or the other of the above varieties of micrococci; then emigration in purulent infection of the tissues adjacent, with formation of abscesses, in cases where the system tried to free itself from the invasion; later, or in some cases pri-

marily, the micrococci were taken up by the veins, forming colonies in the softened thrombi, and thence were carried to the lungs, or joints, or other seats of pyæmic, or so-called metastatic, abscesses.

When infection takes place, it arises either from wounds or rents in the genital tract, or by absorption from surfaces not wounded but laid bare by the process of parturition. In the former case, the infection is apt to be rapid, to run quickly over the pelvic areolar tissues, and end fatally with great rapidity.

"Where there are no wounds, the process may be also rapid, and here, on examination, hardened veins may be felt in one of the broad ligaments. In a few hours these are surrounded by hard exudations, which soon soften down, and with an overwhelming general blood-poisoning, the patient dies pyæmic. Generally, however, the process instead of spreading by the veins, goes on by a creeping infiltration of the parametric areolar tissue, with symptoms of more or less rapid septicæmia, according to the acuteness of the infection, the resistance of the organism, and the treatment. The lymph glands offer some resistance, but it is insufficient, and the infection spreads, destroying everything in its course. Usually nothing resists it; muscles, fascia, vessels, and glands are infiltrated and softened, and at any time the micrococci may pass into an eroded vein and terminate the process fatally, or by a slower spread the phlegmon may increase until it reaches the peritoneum; or, happily, the mass becomes circumscribed by thick abscess walls, and begins to point towards the vagina, bladder, rectum, or abdominal walls; in this way it may be evacuated spontaneously, or reached by the knife or trocar, and drainage tube of the watchful practitioner."

Virchow has given a most thorough description of the anatomical processes here considered. (V.'s Archiv, 23 Bd., 1862, 3 and 4 Heft, S. 415.) Also Freund, in his new and monumental work, "Gynækologische Klinik," S. 238, de-

PLATE A.

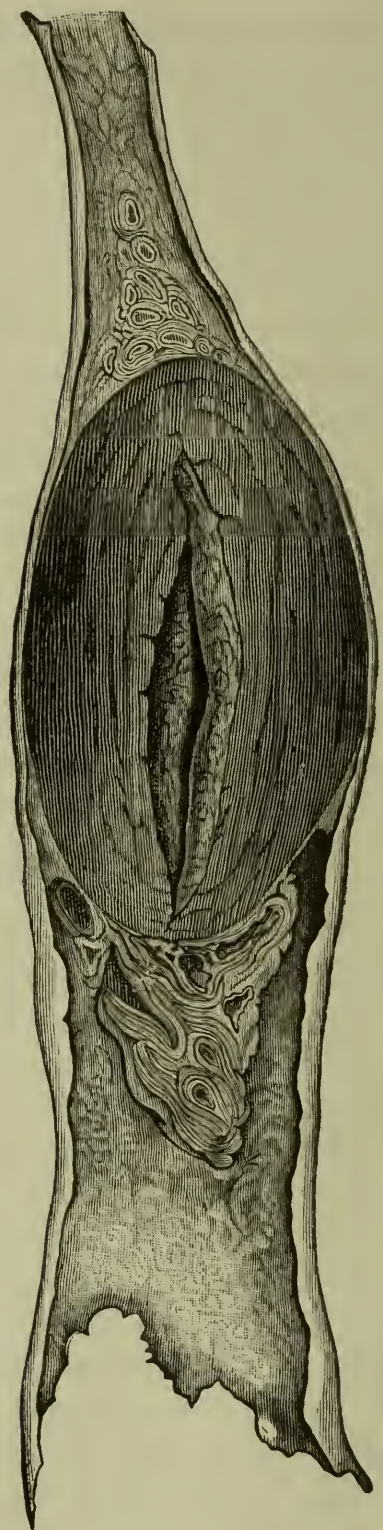


PLATE B.

scribes the course of the disease as above, and insists on the distinction between the condition of the sheaf of vessels in the broad ligament in septic and in ordinary phlegmons.

I subjoin two figures taken from Freund's work, to which I shall again refer.

In the first, *Plate A*, they are infiltrated, separated and their sheaf is broken up and destroyed, while in ordinary phlegmons the latter is preserved, although compressed or deformed, *Plate B*.

Of course, it is *conceivable* that the infection in such cases is quite accidental, occurring from the micrococci floating in the air as dust; and in fact the researches of Passett show that the staphylococcus can be dried and yet preserve its life and power of development; and, moreover, that it exists independent of the human body, as, for example, in kitchen-sink water and in stale butcher's meat, and there is little doubt that wounds may be infected by this organism, either directly from the air or by its being deposited from the air on dressings or instruments, particularly in hospital wards where there have been cases of sepsis prevailing. But the more frequent organism in puerperal infections is the streptococcus, which does not appear to be as commonly met with apart from diseased persons and their surroundings, and it seems very improbable that either of these varieties can get into the uterus except by direct importation, while no one now considers infection by inhalation as worth discussing. The fact is now established, at any rate, that, when hands and instruments are kept surgically clean, and no direct infection is allowed to occur, puerperal fever is abolished in properly conducted hospitals, as far as concerns women who come into them before labor commences. As far as I could learn in Vienna and Munich, no cases, or almost none, occur, except in women who are sent in already infected and in the throes of difficult labor. Yet the windows are open; there is puerperal fever, so-called, always in the city; there is free coming and going in the

wards. To my mind the inference is irresistible that puerperal fever does not exist as an endemic or epidemic disease in the sense formerly supposed, but is only a name for the symptoms of an infection of the puerpera by direct carelessness or uncleanliness of somebody, let us say the nurse, as we would gladly suppose that physicians are *always* thoroughly careful and surgically clean.

Moreover, the source of infection is no mysterious aroma or miasma, inseparably connected with the nurse or physician. It is solid and tangible, and usually under or around the finger nails, and can be removed by soap and water, by baths and nail brushes, or killed by a 1 to 1,000 solution of sublimate, or by carbolic acid in two per cent. solution, or by permanganate of potash, etc. Clothes can be sterilized by baking them in an oven for an hour or more at a temperature just short of 300° F., when they begin to scorch.

The day is at hand when the presence of chains of streptococci in a puerperal woman will be considered a disgrace and dishonor to her accoucheur, and this standard is already attained in surgical operations in the best hospitals. I do not say that at present all such accidents, so-called, can be avoided; but I am sure that there will be a more critical spirit in the public as well as in the profession; less talk of bowing to the visitations of an inscrutable Providence, and more reviling of negligent doctors, and I trust more care in selecting properly-trained nurses. Deliveries at home ought to be at least as safe as those in public hospitals. Five or even three years ago they were incomparably safer. Now I know that in the *best* public hospitals the results are better than in the average home, provided not only death but lighter cases of septic pelvic inflammation are included.

In the bodies examined were found, in all cases, one or several of the three septic bacteria, streptococcus, staphylococcus, or bacillus pyogenes fœtidus, alone or in combination. The most constant, and usually occurring alone, was the streptococcus. Less frequent in the puerperal process,

but more common in peritonitis after operation, was the staphylococcus.

The B. pyogenes fœtidus did not occur alone, but was found twice in combination with staphylococci in cases of which I will speak more fully. The cases were not numerous enough, nor do I have sufficiently accurate histories to warrant me in drawing any conclusions as to comparative frequency; but they seemed fair average cases, and I will briefly report what I found, my intention being rather to show the specimens, as average samples of what usually occurs, than to enter into any argument to prove that bacteria, and nothing else, are always the cause of septic processes, — a fact which personally I believe, but which cannot be demonstrated in a forty-minute paper.

Fig. 1. 800 x.

First I show, *Fig. 1*, for purposes of comparison, streptococci of erysipelas from a culture in meat-water-peptone gelatine. You will see micrococci always in pairs, forming chains or resembling strings of beads. Some chains, however, are much larger than the others, and the links form short rods, each rod being just about to divide into two members. The difference in the size of the different cocci is quite noticeable.

I next show, *Fig. 2*, similar chains from a phlegmon of the arm, in a case of paralytic dementia, where the infection had resulted from a scratch, setting up a diffuse cellular inflammation.

Fig. 2. 800 x.

Having observed these, please look at this preparation of pus, *Fig. 3*, from the knee-joint of a young woman, who died some two weeks after delivery, with obscure symptoms

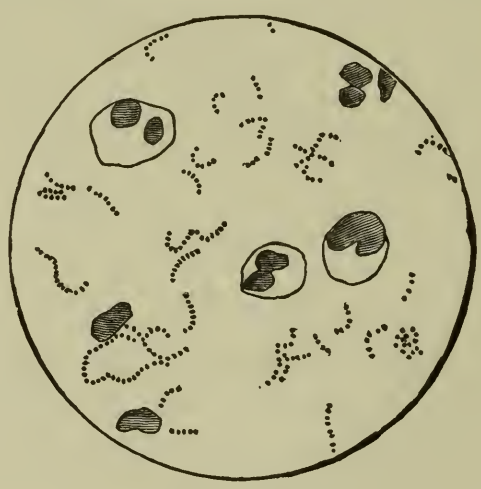


Fig. 3. 800 x.

of fever and stiffness in the neck, with moderate pain in right knee. At the autopsy, the uterus was not apparently diseased, nor was there any pelvic abscess; but the right

sterno-clavicular articulation and the right knee-joint were full of creamy pus, which looked laudable, but was filled with chains of streptococci.*

I will here state that every care was used in taking the specimens examined; the skin was well washed, also the knife used, and the pus was aspirated into capillary tubes which had been sterilized and sealed beforehand. The examination of the pus, or blood, was made at once, so that there is no doubt that whatever you see came from the interior of the bodies examined, and is not a result of accident or carelessness.

This case represents a class where infection has occurred usually from the hand of the physician, or nurse, and where death results without noticeable pelvic inflammation, or decomposition in the uterus. The resemblance of the chains to those of erysipelas is very interesting, in view of the fact, so well established, of the infection of many puerperæ by physicians who have taken care of cases of erysipelas. This fact, so well described by Dr. O. W. Holmes many years ago, in his work, entitled "Puerperal Fever a Private Pestilence," and so often noticed since, was well illustrated by Dr. H. O. Marcy, who last summer reported five consecutive cases of puerperal fever seen by him in consultation, where the physician who attended them all consecutively had first had charge of a case of facial erysipelas. The last of these cases developed cutaneous erysipelas around the buttocks, and, from the fluid in the blebs which were developed, Dr. Marcy reports that he cultivated chains of streptococci. Or, to go back to the first authorities, let us remember the aphorism of

* Dr. Biggs, of the Carnegie Laboratory, New York, kindly furnishes the following description: "In a case of low septicæmia following confinement, a suppuration of the right knee-joint developed about two weeks after delivery. After death, the pus in the joint was found to contain a pure form of streptococcus. At the temperature of the human body, this germ grows extremely slowly upon agar-agar, forming a very delicate, transparent, and easily perceptible layer upon the surface of the agar. It also grows very slowly in gelatine, and only reaches a very moderate development when the growth ceases; it induces slight liquefaction of the gelatine." Dr. Biggs had no opportunity to make experiments with it on animals.

Hippocrates, "If a pregnant woman get erysipelas in her womb, it is fatal." It is interesting to note, in connection with the suppuration in the knee-joint above mentioned, that Löffler,* in his experiments with pure cultures of streptococci, repeatedly found that, after injecting them into the veins of the ear in rabbits, abscesses formed in the joints of the hind legs of the animals, which, being opened, were found to contain streptococci.

The next case to which I shall call your attention came into the hospital feverish, and was delivered; and, as the pyrexia continued, she was sent to one of the medical clinics, after a few days, to avoid danger to the other lying-in women. The lochia became extremely offensive, the fever and chills continued, the skin grew yellow, and she died in about a fortnight, with all the symptoms of pyæmia, or we will say blood-poisoning. At the autopsy, the uterus was found to contain a piece of placenta, perhaps one and one-half inches square, with a great deal of horribly offensive putrid fluid. There was pus in the uterine and iliac veins, abscesses in the parametrium, and in other parts, especially the lungs. I show specimens, *Fig.* 4, from the iliac vein, *a*, and from the blood pressed from a cut in the lung, *b*. You will see a very few micrococci in chains, and many of the thick bacteria of decomposition, besides the bacillus pyogenes fœtidus of Passett; these last probably accounting for the terrible odor. Staphylococci are also present in large numbers, forming the characteristic evidence of infection, appearing in clusters like bunches of grapes, staphyloi, or in larger masses like spawn of frogs or fish. They also occur alone, or in pairs, and when pairing or dividing, resemble short bacilli. As for the chains present here and in the next case, they are so few in number, and show so little evidence of arrangement in pairs that I think they should be considered rather as a casual or

* Mitth. d. *Kais. deutsch. Ges. Amtes.* 1884.

accidental arrangement of the staphylococci, than as streptococci proper.

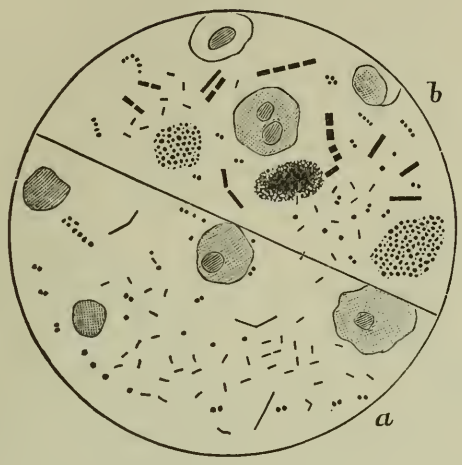


Fig. 4. 800 x.

The last case to which I shall refer is that of a woman who had a myoma of the uterus as large as an infant's head, growing on a pedicle about one and one-half inches thick. This was removed by the vagina, by Carl Braun, and the

Fig. 5. 800 x.

pedicle severed by the galvano-caustic wire. Just before the operation, while under chloroform, digital examination was made by a large number of students present, and although they all washed their hands previously, yet some

of them probably did not do it thoroughly. After the operation, the uterus was well douched with bichloride, and the stump powdered with iodoform, yet it was insufficient. Some micrococci had been inoculated, where the disinfectant could not follow them, and in a few days the patient died septic. The autopsy showed pus infiltrated in the stump, and from there the infection had spread, causing abscesses in the pelvis, etc.

I show you a specimen of pus taken from the stump, *Fig.* 5, *a*, at some one-half an inch from the cut surface; it is filled with masses of micrococci, evidently staphylococci, and there are *bacilli pyogenes fœtidi* in abundance, also bacilli of putrefaction, the saprophytes of Rosenbach. I show also from this case, *b*, a preparation from a second culture, in meat-water-peptone gelatine, which shows the same organisms, the bacilli pyogenes fœtidi, which grow most rapidly, being now the most abundant.

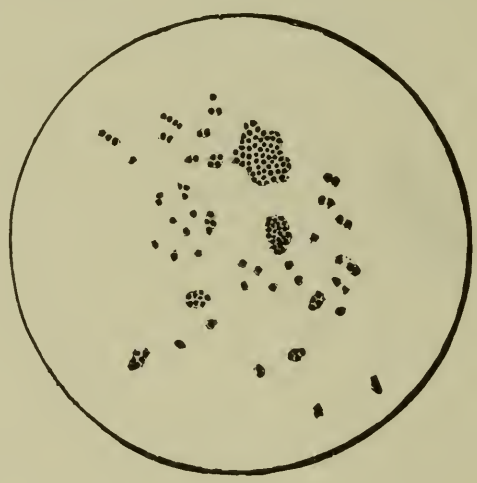


Fig. 6, 800 x.

Here is also for comparison a preparation from pus, from a case of acute infectious osteomyelitis of the tibia, or necrosis, as we used to call it, showing the staphylococci, and also one, *Fig.* 6, from a second culture of the same.

Likewise here, *Figs. 7 and 8*, is a very thin section of a

kidney, a so-called surgical kidney, showing the plugging of the tubules with masses of the staphylococci, and the heaping together of white cells, which is Nature's mode of fencing out the intruders by the formation of an abscess.* Although this specimen did not come from a puerpera, yet it is just as valuable, for the same condition is not infrequent in puerperal septic inflammations, and it demonstrates perfectly how

Fig. 7, 100 x.

Fig. 8a, 300 x. *Fig. 8b*, 800 x.

these bacteria are carried about by the circulation, how they are deposited, forming so-called metastatic abscesses, and how the system tries to repel and eject the invaders.

I hope that I have not taken up too much of your time in describing these investigations. They were not made for publication, and hence the general nature and imperfectness of the above descriptions. I was working merely to satisfy myself of the real cause of pyæmia and septicæmia. For years I had desired to study this question, for, as interne of Bellevue Hospital in 1871, I was very deeply impressed by

* In *Fig. 8, a*, the artist has represented the nuclei of the leucocytes on each side of the figure rather too small; the nuclei of the epithelial cells are shown in the middle of the tubule and on either side of it; the staphylococci form plugs at each end of the tubule, but on the inner ends of the dense plugs and on their edges the staphylococci can be seen. The outlines of the cells cannot be seen with the Abbe-condenser when the diaphragm is removed in order to see the cocci.

the terrible mortality after operations and amputations, and no one has followed the progress of science in this particular with more interest than I have done.

I suppose most of you have read the recent article of Dr. Stephen Smith, in the *Record*, on the past and present condition of Bellevue Hospital in regard to pyæmia and suppuration, and, as one who followed that revered teacher in those days, I can testify to the vivid picture recalled by his accurate and graphic description. Those were the "good" old times when the faithful house-surgeon was thought to have done well if he had no maggots in the wounds in his wards in August, and when the whole staff would poke their fingers into a compound fracture before putting it up, and carefully wash their hands *afterwards*.

How many of the profession must feel, when reflecting on the weary suffering and miserable death of their patients, both surgical and puerperal, as Faust did when applauded by the peasants for his efforts and those of his father in fighting the Pest.

Here, lost in thought, I've lingered oft alone,
When foolish fasts and prayers my life tormented.
Here, rich in hope and firm in faith,
With fears, wrung hands, and sighs, I've striven,
The end of that far-spreading death
Entreating from the Lord of Heaven!
Now like contempt the crowd's applauses seem;
Couldst thou but read, within my inmost spirit,
How little now I deem
That sire or son such praises merit!
My father's was a sombre, brooding brain,
Which through the holy spheres of Nature groped and wandered,
And honestly, in his own fashion, pondered
With labor whimsical and pain:
* * * Death the patient's woes soon ended,
And none demanded: Who got well?
Thus we * * * worse than the pestilence have passed.
Thousands were done to death by poison of my giving;
And I must hear, by all the living!
The shameless murderers praised at last.
* * * * * * * *

O happy he who still renews
The hope from error's deeps to rise forever!
That which one does not know, one needs to use;
And what one knows, one uses never.

But it was the dawn of the new day. Lister was beginning his teachings, and he found willing listeners in Bellevue, until now suppuration is abolished *there*, and abdominal section is performed weekly or oftener, with less than seven per cent. of mortality, including all cases. Now all these questions are clearing up; antiseptic surgery is almost a fixed science; but much of the old mystery and confusion still clings to the puerperal processes. Not every one is willing to allow the analogy between operations and deliveries, and to consider every puerperal fever as an infected wound.

If my imperfect observations have made the analogy more striking in your minds, I shall be more than satisfied; but, before closing, I will make a very few more remarks concerning treatment, and treatment is naturally divided into prophylactic and remedial. There is no need to emphasize the superiority of the first, especially in such a grave disorder, and I presume that all are agreed that the strict rules of surgical antisepsis should be extended to midwifery. I have already outlined the precautions on the part of the accoucheur as to perfect cleanliness which the patient has a right to expect; but, to make the patient aseptic, the precautions must be taken before labor and during delivery. We must not depend on perfunctory injections, given by ill-trained nurses, after labor; on the contrary, they are unnecessary and ill-advised in cases of normal labor.

I will quote a few lines from a letter which I wrote from Berlin last spring, published in the *Boston Medical and Surgical Journal* of May 14, 1885, as to the prophylactic treatment in Berlin, which may be taken as a type of that in German and Austrian hospitals: —

"After a bath and scrubbing of the body, and especially of the genitals, with soap and water, the vagina is well and thoroughly douched with a solution of corrosive sublimate in water, 1 to 5,000, and the external parts and ostium vaginæ are washed with a solution of the same, 1 to 1,000; whenever during labor there are repeated digital examinations, the vaginal douche, 1 to 5,000, is used again. Toward the end, the vulva is well anointed with corrosive sublimate in glycerine, 1 to 1,000. After delivery of the placenta, ergot is given, and the vagina is well washed out with the 1 to 5,000 solution. If there has been any operation, the uterus is also washed out with the same solution. Then the vulva is washed and douched with the 1 to 1,000 solution. After that there is no more vaginal douche and no need of it. External cleanliness and daily washing of the vulva with 1 to 1,000 sublimate solution suffices. The most scrupulous care, however, is taken to prevent infection by the doctors or nurses during delivery. Everywhere in the wards, and in the lying-in rooms, are abundant facilities for hand washing, which is not a simple form, but a real scrubbing of hands and arms up to the elbow. This is done most thoroughly before and after examinations per vaginam, and in deliveries the hand is always put into the 1 to 1,000 sublimate solution before making an examination. It is then not dried, but oiled while wet and so introduced. *Finis coronat opus.*"

In order that this opinion may not seem to rest too much on my own way of thinking, I will again quote from Freund, whose great work is the latest authority on the subject.

"But since the successes of lying-in institutions have clearly shown that the above affections (septic parametritides), which represent the chief contingent of the diseases grouped together as puerperal fever, can be so far prevented that a healthy puerpera does not get sick, and one casually brought in already sick after labor does not become a fire-brand to infect the many puerperæ lying in the hospital, it is well that every one to whom such an institution is entrusted should declare the principles on which he administers his responsible

office, and should emphasize those controlling influences which seem to him to be the most important. Taking for granted the conscientious performance of the general antiseptic precautionary measures, which at present have long become part of the code of medical propriety and professional honor, I consider the chief factors of prophylaxis to be: a delivery as gentle as possible, avoiding lesions; a strictly surgical treatment of any injuries that may have occurred (careful suture); the so-called expectant management of the period of labor following the birth of a child, leaving, under normal conditions, the expulsion of the placenta to the forces of Nature; *the leaving undisturbed the internal genital apparatus of the healthy puerpera;* finally the local treatment of local, carefully diagnosticated, affections of the genitals during the puerperal period."

If, nevertheless, we have to treat a case where it appears that infection has taken place, where fever, chill, or foul lochia show the inception of trouble, here surely something more is due from the physician than to order the nurse to give a vaginal douche of slightly carbolized water. Time is precious; a very few hours may be enough to find his patient fatally infected. He must satisfy himself, by a careful examination of the condition of the parts, whether there are any secundines in the uterus, or any rents or wounds to absorb septic matter. He must himself wash out the uterus, and not merely the vagina, as often as is necessary, with simple water, or better, with two per cent. carbolized water, or 1 to 1,000 sublimate solution. In bad cases this may have to be done very often. Wiley reports cases where even once in two hours was not sufficient, but the patient was saved by very frequent disinfective douches. Iodoform is also of great value in pencils in the uterus, in gauze in the vagina, or in powder on abrasions or wounds. In short, the accoucheur must work as promptly, conscientiously, and energetically as would a surgeon who found a case of compound fracture doing badly, and feel as little disposed as would a surgeon in such a case to leave to a nurse what he ought to do himself.

Time forbids any attempt to enter here into the relative merits of different antiseptics, or the question whether simple water is not enough. Each method has its partisans, and each likes the treatment that suits his ideas or pleases

his vanity. *Trahit sua quemque voluptas.* I can only insist that the matter is to be decided on strictly surgical principles, such as would govern the treatment of any "pus cavity" or infected wound difficult of access and situated near vital parts.

Thus we see that if every fatal case is an infection, not every infection need be fatal. It is not only a question of seed, but also of soil and of conditions, or, as Hippocrates said in an aphorism, that in every case there are three factors, — the disease, the patient, and the physician. If bacteria could always fatally infect, the human race would long have ceased to exist. But here, as in the case of other infections, the human organism fights against the lower forms, and is often victorious, *provided the continued source of infection is early enough removed* by cleansing the cavity of the uterus, and provided the system is supported, and the constitution is not overwhelmed by an irresistible infection, or weakened by previous disease, or by hunger, grief, or shame. Under favorable circumstances, the invading bacteria are caught and fought by the wander-cells; they are fenced off in closed abscesses, and kept prisoners until they die or are evacuated. Symptoms of sepsis are, therefore, not a signal for blank despair, but are a call to conflict, a summons to attack the materia peccans in front and rear, generally and locally, especially locally; and in nothing is the prompt and judicious interference of the physician more satisfactory than in these cases. When a puerpera gets a chill and has fever, we must not think, Oh, dear; she has puerperal fever; she will die. We must think as the surgeon does when his patient shows similar symptoms, Aha, there is pus collecting somewhere; I must find it, I must wash it out, I must drain it.

RAPID DILATATION OF THE CERVIX UTERI.

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OF CAMBRIDGEPORT, MASS.

Read Nov. 4, 1880.

ALTHOUGH rapid dilatation of the cervix uteri is a most admirable operation, I do not think the subject has received that degree of attention from gynecological writers which it merits. Dr. Emmet, in his recently published work on Gynecology, scarcely more than alludes to the subject. On page 139, he speaks of dilating the uterus, and for this purpose he uses a sponge tent; choosing a bright, clear day, with the wind from any quarter except from the east. Experience has taught him that during a state of the atmosphere favorable to an active condition of the skin there will be less danger of blood-poisoning. Further on, the same author discusses the subject of dilatation of the uterus by the use of the intra-uterine stem pessary, for dysmenorrhea, flexures, and sterility; also lateral division of the cervix, as practised by Sir James Y. Simpson, for enlarging a narrow canal. He also specifies Sims's method — the backward incision — in the treatment of flexures; but introduces nothing material on the matter we are about to consider.

In the Transactions of the American Gynecological Society, Vol. III., there is an extended article by Marion Sims on the surgical treatment of stenosis of the cervix uteri, in which he claims to have established certain points in regard to the different kinds of incision, but nothing about rapid dilatation.

In Braithwaite's Retrospect (January, 1880), Dr. J. Matthews Duncan speaks of the treatment of spasmodic dysmen-

orrhea by means of bougies, from 9 to 12 or 13. These various numbers are not all to be used in one day; say from four to eight sittings. In Braithwaite's Retrospect (January, 1877), Dr. Lombe Atthill contributes an article on dilatation of the uterus in disease of the cavity, in which he says: "Never dilate the cervix uteri for the cure of dysmenorrhea, or sterility, depending on a narrow cervical canal or a conical cervix;" and "never use metallic dilators of any kind for that purpose, but choose either sponge or sea-tangle tents which expand slowly and gradually." Yet he recommends us never to continue the process of dilatation for more than forty-eight hours; and he prefers postponing all operative interference for some weeks, rather than risk the result of prolonging the dilating process. He looks upon the treatment of mechanical dysmenorrhea by dilatation as being altogether a mistake, because in several cases grave symptoms resulted, and in one case death, that is, by slow dilatation. Of the truth of this last remark we have no doubt; but concerning rapid dilatation by means of metallic dilators, we regret that he had not made more particular mention of any case in which grave symptoms resulted. By omitting to make such mention, we are led to doubt the correctness of his conclusion.

Dr. Thomas, in his work on Diseases of Women (1874), referring to obstinate dysmenorrhea, or cervical constriction, says: "Another method, which has been employed with advantage in many cases, consists in the dilatation by means of expanding instruments." He mentions a modification of Holt's stricture dilator for this purpose; then says: "The action of these instruments is too injurious to the tissues to be safe, and are by no means so promising of good results as the use of cutting instruments."

Dr. William Cumming, of Edinburgh, assumes that "true stricture of the cervix is extremely rare, and that incision of the ora and cervix uteri, with subsequent dilatation by tents, is unnecessary, and may be and often is injurious, but that

hemorrhage resulting from it is beneficial;" so he practised scarification of the os uteri, followed by dilatation with graduated bougies.

Dr. E. J. Tilt, in a paper on Constriction of the Cervical Canal, speaks of Dr. Debron tunnelling through the cervix, and succeeding in making a passage sufficient for the menses to pass and for conception to take place. He agrees with most pathological writers that the cervical canal, lined by mucous membrane liable to inflammation and ulceration, constituted by walls of dense structure half an inch thick, susceptible of induration, is frequently strictured by abnormal development, not by spasmodic constriction of the circular fibres of the cervix. There will be found in the Boston Med. and Surg. Journal, Vol. 94, page 216, a report on dysmenorrhea by Dr. Finkel. According to Dr. W. L. Richardson, the reports relate to an examination of seven specimens, taken from four different patients who suffered from membranous dysmenorrhea. The membranes were unmistakable casts of the uterine cavity. Sometimes small fibrinous villi were seen on their external surface. They were formed by the mucous membrane with glands, and consist of a mixture of glands, vessels, and particles of fibrine. The uterus was generally enlarged and displaced. The disease is regarded as endometritis, which is characterized by the accumulation of numerous granulation cells in the mucous membrane and submucous tissue, the elements of which are separated and raised by the cells. An abundant effusion of blood takes place into the deeper layers of the mucous membrane, and thus assists the process. The whole is finally detached and thrown off as a foreign body.

Lawson Tait, speaking of dilatation of the cervix uteri, says the use of sponge tents is always followed by the production of a fœtid discharge, and this he has more than once seen to result in fatal septicæmia. The apparatus he employs consists of a series of boxwood plugs of conical shape, varying in size, and applied by continuous elastic pressure.

He was able to dilate the cervix in the space of twelve hours or so. This plan of treatment, though far preferable to that by sponge tents, is not as satisfactory as rapid dilatation. Schroeder refers to a case of stenosis, reported by Barnes, in which mechanical dilatation had been employed. Conception took place, notwithstanding a constriction followed the operation; but the stenosis returned after a miscarriage in the fifth month.

From this one case, Schroeder infers that the transitory nature of such dilatation will be found to apply to the new process recommended by Ellinger. In a communication on the External and Internal Orifices of the Uterus, by Dr. J. Henry Bennet (British Medical Journal, 1872), he says that the closure of the uterine orifices is so much the rule in the healthy female that a patulous condition of either orifice may be generally considered to imply disease. In having recourse to dilatation he was not guided by the resistance of the os internum to the sound. He had resorted to dilatation in congenital cases, because there was no other apparent cause for dysmenorrhea but narrowness of the passage. In pseudo-membranous dysmenorrhea, he dilated to give exit to the membranes; in chronic inflammatory diseases, he dilated because the removal of the morbid condition was not followed by spontaneous dilatation of the narrowed orifice and disappearance of the dysmenorrhea. As to division of the os internum, he felt disposed to limit it to those exceptional cases of conoid cervix in nulliparous women in which the orifice of the os internum is preternaturally small. But he did not consider it a rational surgical procedure to dilate the cervix by cutting it in two. What surgeon, says he, ever proposed to dilate a stricture of the male urethra by dividing the entire penis in two halves?

In 1864, Greenhalgh had divided the os internum several hundred times within a few years. Marion Sims and Emmet divided the os externum, down to its vaginal attachments,

more than five hundred times within a few years, in their hospital at New York, with satisfactory results. Bennet says, "These women should have been seen a year after the operation."

Dr. Graily Hewitt remarks: "It cannot be disputed that much may be effected by dilatation. The plan is an imitation of the process Nature adopts in evacuating the contents of the uterus, and its failure in some cases should not lead to its rejection in all. Something has been said as to the danger of dilatation; but there is no reason with which I am acquainted for believing it more dangerous than any other kind of manipulation to which the cervix may be exposed." I regard instruments formed like Thompson's urethral dilator to be useful in straightening and restoring flexed uteri.

Dr. J. Protheroe Smith (Brit. Med. Jour., 1871) mentions a successful method of treating certain cases of dysmenorrhea and sterility. In 1841 he had an instrument made after the model of Heurteloup's lithotrite, by which the extent and direction of the uterine cavity was easily measured, and a constriction in any part of the passage readily overcome. With this instrument he dilated the constriction at the os internum, and gave the normal shape to the os tincæ by dividing it laterally at the commissures of the labia uteri *per speculum*. He had adopted this mode for more than a quarter of a century; and, although he had failed in the cure of some cases, he had succeeded in so many that he felt warranted in advocating its adoption in selected cases, after removing morbid conditions.

Dr. Mackintosh, of Edinburgh, in 1832, was the first to point out the dependence of dysmenorrhea upon mechanical constriction of the cervical canal. In 1847, Sir James Y. Simpson described his operation of incision of the cervix, and Dr. Smith followed his mode of treatment for some time; but the results were not such as to convince him of the advantage of its general adoption.

In Vol. II., of the Transactions of the American Gynecological Society, Dr. Ellwood Wilson, of Philadelphia, has cited eleven cases of the efficacy of the treatment of dysmenorrhea and sterility by rapid dilatation. He employed an instrument of his own device. This method, he says, has not only greatly benefited his patients, but, in several instances, women who have been married many years, and seemed barren, after its employment have borne living children. Dr. Goodell states that by forcible dilatation of the cervical canal the stem-like neck of the pear-shaped womb is shortened, widened, strengthened, and straightened. Hence, for straightening anteflexed and retroflexed uteri, and for dilating and shortening the canal in cases of sterility or dysmenorrhœa, the dilator will be found an efficient instrument. By forcible dilatation he has at one sitting cured a dysmenorrhea of long standing, and relieved all the distressing symptoms arising from stubborn cases of anteflexion and retroflexion. Dr. Goodell speaks of the improvement, from forcible dilatation, in cases of cervical endometritis, by changes produced in the nutrition of the parts, and by a temporary paralysis of the constricted fibres, as fissures of the anus are cured by forcible dilatation of the sphincter. He also adds that the uterine dilator will be found useful in cases of metrorrhagia, in which injections into the uterine cavity are necessary, as well as in cases in which the armed applicator and stem pessary are to be employed. For stenosis, rapid dilatation is preferable to the tent.

The following cases, from my note-book, are here offered to illustrate the benefit derived from the treatment by rapid dilatation : —

Mrs. D., aged twenty-four years ; married four years. After the appearance of the menses she had to be often absent from school on account of severe pain during the time of menstruation. She had been under an extended treatment, but received only temporary relief. She was fre-

quently told that after marriage the dysmenorrhea would cease. At the time I was called (August, 1877), the patient was suffering from severe pain in the region of the right ovary. There was a profuse catarrhal discharge from cervix and vagina lpassage; also, great tenderness in right groin. She had been confined to her bed for several days. Vaginal examination, by means of Sims's speculum, revealed a small, contracted conoidal cervix, exceedingly tender to the touch, with a great quantity of thick stringy matter about the os and cervix. Uterine sound and probe could not be made to pass the os internum. Diagnosis: dysmenorrhea and sterility, also marked anteflexion from stenosis. There was a preternaturally small os internum, undoubtedly congenital. Douches of hot water were used for upwards of two weeks. Suppositories of morphia and belladonna were freely employed to overcome the pain and nervous disturbance. This gave temporary relief. At length the patient was etherized and placed in Sims's position, and the uterus brought down by means of vulsellum forceps. A powerful uterine dilator was employed. The os and cervix were gradually dilated. Half an hour or more was consumed before the operation was completed. The index finger could then be readily passed through the os internum into the uterine cavity. The next day the patient was very comfortable, and within a week she was up. Her menses appeared about the first of September. She remarked that she could not remember having had so little pain and sickness during a menstruation. At the time of the next menstruation she suffered more than during the first immediately after the operation, as she had taken cold from being out in a rainstorm two days previous to the return of the menses. She continued however to improve, and in February, 1878, became pregnant. Nine months after she was delivered of a healthy child. Since the birth of this child her health has been good.

Mrs. H., married when eighteen years old; parents

healthy. She had suffered severely from time to time during menstruation. Had to leave school, and to discontinue education in music, owing to a cough and a severe pain in right groin. No history of any lung disease in family. Physical examination of chest revealed nothing of importance. After marriage, for a while, she appeared better. Her old symptoms at length returned, and constitutional treatment gave only temporary relief. Vaginal examination by means of Sims's speculum showed a small, pale, conoidal cervix. I was unable to pass a uterine sound or even a uterine probe through the os internum. Cervicitis, accompanied with tenderness and a catarrhal discharge, existed. Douches of hot water were given for the next month twice a day, half an hour at a time, while the patient was in the recumbent position. A week after the next menstruation, which for the first two days had been somewhat easier, the patient was etherized, the os uteri drawn down, and rapid dilatation accomplished in the same manner as in the preceding case. The patient rallied well from the ether; next day the temperature was not above normal, and no untoward symptoms occurred. Subsequent menstruation was comparatively easy. Pregnancy occurred seven months after the operation; but, by some accident, an abortion occurred on the third month. Pregnancy again occurred after the lapse of a few months. After the operation she fully recovered from the cough and dysmenorrhea.

The next three cases, in which rapid dilatation was resorted to, presented nothing of material interest, except that the patients were unmarried, and were of the ages respectively of thirty-two, twenty-nine, and twenty-seven years. All of them suffered from severe dysmenorrhea. In the last case there was marked anteflexion. The cervix in each case was conical, with unusual closure of the internal os. The operation had the effect of shortening, widening, and strengthening the stem-like neck; also relieving the painful menstruation, and restoring the general health.

The next case was that of Mrs. P., aged 27 years; parents healthy; married five years. She had suffered more or less since her menses first appeared, at the age of fifteen years. Had been under care of different physicians, with only temporary benefit. Has lived with her husband since marriage, but never became pregnant Has suffered severely at times from pain in "left ovary," as she expressed it. She often required full doses of opiates to relieve the suffering. I saw the patient Nov. 25, 1879, when she was suffering from pain and tenderness of left groin. Vaginal examination showed cervicitis, with an abundance of thick catarrhal discharges; but, as the uterine probe could be made to pass through the os internum, I inferred there was no preternatural closure of that part. I used hot water applications and opiate suppositories. I attempted to dilate the external os with small carbolized sponge tents. A very small curved tent could be made to enter the os; but, on removing it after several hours, it was found that only the lower portion of the canal was dilated; and, though the tents were thoroughly carbolized, they excited severe constitutional disturbance. At length I became satisfied that there existed an undue constriction of the inner os. With the assistance of Dr. A. L. Norris, the patient was etherized, and placed in the proper position. The uterus was drawn down with the vulsellum forceps, and rapid dilatation was performed by means of Ellinger's dilator. Half an hour was occupied in the dilatation, so thoroughly as to admit the index finger. After the operation, the anteflexion was found to be markedly less. A large-sized Macintosh uterine dilator was left in the canal for a while, and a tampon applied. Next day the temperature was only 99°. The patient was quite comfortable after the removal of the plug. Her next menstruation caused her no pain, the first she ever had without experiencing acute suffering. In April she reported that she was pregnant, and soon after left the city for her own home in the country. Her health has since been good.

I have notes of six other cases of congenital stenosis, and in each there was a small, conical cervix, with extreme closure of the internal os. Rapid dilatation was resorted to in each with the result of curing the dysmenorrhea. After the lapse of more than a year, there was no return of the constriction, nor of the painful menstruation.

My experience leads me to say that, in the present state of gynecology, with its improved instruments, rapid dilatation of the cervical canal, in properly selected cases, is an efficient method of treatment for stenosis and dysmenorrhea; much more safe than dilatation of the cervix, tried by means of plugs, bougies, or carbolized sponge tents. Many cases of septicæmia have been recorded as following the use of tents. The method of treatment by incision is coming more and more into disfavor; not only on account of the deformity this operation induces, but also on account of the hemorrhage and other untoward symptoms with which it is so often attended.

CORROSIVE SUBLIMATE INTERNALLY.

BY C. W. STEVENS, M.D.,

OF CHARLESTOWN, MASS.

Read February 9, 1888.

I WAS first lead to use Corrosive Sublimate internally in puerperal septicæmia, by observing its beneficial effects in diphtheria. The principle on which I base its use was announced in 1884, at the Medical Congress in Copenhagen, by Dr. Bouchard, who then made this statement: "Medical antiseptic therapeutics does not propose to kill the microbe, but only to stay its pullulation. Even slight modifications in the human infected organism may prevent the indefinite multiplication of certain microbes which has invaded it." It follows from this that germicides, taken internally, need not be strong enough to poison or even harm the patient.

It was found by Roice, of Utrecht, that, in any suppurating focus, microbes are found in the blood and kidneys.

Dr. H. J. Garrigues, in his paper on puerperal fever, has endorsed this view, by recommending, in addition to local treatment, "carbolic acid, sometimes combined with tincture iodine."

Dr. Macan, in his report of the Rotunda Hospital for 1883, declares that he knows nothing which will quicken the elimination of the poison from the system in hetero-genetic infection. If we can hinder the proliferation of microbes, or render them inert, is it not as important as their elimination from the system? In cases in which the source of the poison is hetero-genetic, I am accustomed to attempt to sterilize the air in the patient's room by means of iodine vapor. I place iodine scales in cups with a little alcohol, and suspend them around the room. The fumes are not dis-

agreeable, nor very irritating, and are well borne. I have used bromine, but find it rather troublesome to the throat.

My formula for administration of the bichloride is:

℞ Hydrargyri chloridum corrosivum gr.j;
Potassæ chloras, saturated solution, ℥i;
M. Sig. Take 20 drops in water every two hours.

If any diarrhea supervene, I diminish the dose to fifteen drops, or, if need be, to ten drops. I have never seen any sore mouth, nor any unfavorable symptoms, except a slight relaxation of the bowels, which was relieved by diminishing the dose.

In connection with the internal use of Bichloride Mercury, it may be employed by intra-vaginal or intra-uterine injection. I believe the cases of poisoning have been caused by too large a dose. Dr. Ernst has pointed out that even 1 to 10,000 will stop the proliferation of bacteria. In the uterus I use 1 to 5,000, and in the vagina 1 to 3,000. As to Dr. W. L. Richardson's post-partum pad, I use something more simple, which I think equally efficacious. I get the nurse to wring a napkin out of a tepid 1 to 2,000 solution, and apply it moist. This is done as long as the lochial discharge lasts.

There are certain cases of mercurial idiosyncrasy in which it is better to use injections of Liquor Sodæ Chlorinat, or Permanganate Potass, or Carbolic Acid.

Where chill or uterine colic follows intra-uterine injections, I use crayons or suppositories of iodol. Apart from its dangerously poisonous properties, iodoform masks the lochial odor, which is a great disadvantage. I have always found iodol trustworthy.

Case I.—Mrs., R. aged 18 years, primipara, was confined Nov. 14, 1887, of a still-born child at term. I was obliged to use forceps on account of incompetency of uterine contractions and exhaustion of patient. There was no rupture

of the perineum, and but a slight unilateral laceration of the cervix. She rallied well after delivery. Her lochia were very scanty from the beginning. There was no trouble with the secretion of milk. She seemed to get along in a normal manner, and complained of nothing until November 23, or the ninth day, when she was taken with rigors and fever. The next day, in the morning, I found the pulse 108, temperature 103° Fahr., with severe frontal headache, nausea, and fetor of the lochia. No tympanitis nor diarrhea, and only slight tenderness over the uterus and right ovary. I ordered her eighteen grains of quinine, and injected into the uterus 1 to 60 solution carbolic acid, by means of Jennison's reflux tube. A few minutes after the injection, she had a severe rigor, which lasted half an hour. The next day the pulse was 100, temperature 103°. I now injected 1 to 2,000 of a hot bichloride solution, and applied Tincture of Iodine over the hypogastrium. A few minutes after the douche, she had a bad, long rigor, and became much alarmed.

The following morning, her temperature had gone up to 104°, and she found it difficult to turn over, on account of soreness. The douches had evidently caused shock, and had not relieved her in any way. I now prescribed bichloride, gr. $\frac{1}{48}$, every two hours. The next morning, the temperature had fallen to 100.5°, and the pulse to 92. She felt much better and less sore. I now gave her a vaginal douche of 1 to 2,000 bichloride daily, and continued the same remedy internally until the sixth day after septicæmia set in, when she became convalescent.

Case II.—Puerperal peritonitis of a severe type, with bad sanitary surroundings, in a crowded gypsy house. It was impossible to obtain proper douching. I relied on bichloride internally, which caused a fall of temperature, with ultimate recovery.

Case III. was that of a fourth-month abortion, in which septicæmia ensued from retained placental cotyledons. I

washed out the uterus with permanganate of potass, and found decided improvement on giving the bichloride in the usual way.

I have also treated four cases of facial erysipelas, of which two were puerperal. In these I applied locally a 1 to 8 solution of iodoform in contractile collodion, and gave bichloride in $\frac{1}{24}$gr. doses every two hours. In all of these cases the disease stopped spreading within twenty-four hours from the beginning of the treatment.

CHRONIC CYSTITIS IN WOMEN.

BY W. SYMINGTON BROWN, M.D.,

OF BOSTON, MASS.

Read December 13, 1888.

After centuries of careful dissection, clinical examination, surgical operations on the living, and conjoint study, it is really astonishing how little we know about the anatomy of the pelvis and its contents. Soon after my text-book on Diseases of Women was published, I received several letters and reviews criticising the drawings which illustrate the female genital organs as not true to nature. To which criticism I replied, My dear Sir, I know that. No mere drawing or model can be true to nature, any more than the alphabet can be eloquent. A drawing, to be useful, must be a diagram; and that requires a brain behind it in order to be useful. One might as well find fault with Dr. Auzoux's mannikin because the layers are hard and stiff, instead of soft and flexible as in nature. A photograph, however well executed, only represents one phase of the human face — at rest — a phase non-existent during life; and scarcely possible even after death. We should not expect too much from pictures.

These reflections occurred to me while studying the shape and position of the bladder in women. That organ is almost as movable as the uterus. We are told in books that its transverse is greater than its vertical diameter; but I suspect that the proportions must be reversed when it holds a gallon of urine, as it sometimes does. Then, again, we are told, and told truly, that highly concentrated urine irritates the bladder, and that the irritation may even end in

Cystitis. But it is not so generally known that "hysterical urine," of low specific gravity, almost destitute of saline ingredients, is also a common cause of irritation and pain.

Acute Cystitis is a very rare affection in women: some authors say that it never occurs, except as a sequence of traumatic injuries. At one time many physicians believed that Cystitis resulted from using forceps in labor; and I have no doubt that this erroneous belief acted as a bugbear to curtail the employment of that useful instrument. In our day, very few competent practitioners refrain from using forceps on this account. The probability is that Cystitis more frequently results from long-protracted labors which should have been shortened by applying forceps or by turning.

I have seen only one case of Acute Cystitis in a woman (apparently caused by swallowing Tincture of Cantharides, with the view to induce abortion), and that case may have been due to other suspected agencies. I have also seen three cases in men, during our Civil War, resulting from gunshot wounds in that region.

Unfortunately, Chronic Cystitis is far from being a rare affection in women. Many of the cases occur after tedious labors; some follow innocent attacks of gonorrhea; a few are caused by errors in diet, such as highly spiced food, fermented liquors, gum chewing, etc.; but, in my opinion, the larger number result from not emptying the bladder often enough. A false modesty and a genuine lack of opportunity combine to bring about this disastrous effect.

It is a curious fact in the history of modern civilization that, with all our pretensions to gallantry, so little has been done in large cities to accommodate women in this respect. Some one has asserted that the amount of soap used in a nation is a fair test of the advance it has made in civilization. I would respectfully suggest, as an additional gauge, the number of public urinals for women and men.

When Cystitis has lasted for years, the mucous membrane of the bladder may be detached in shreds, and the inflammation spread to the muscular and even to the serous coats. In most cases of long standing the bladder is contracted to one-half, or even less, of its normal capacity. The mouths of one or both ureters become thickened and congested, sometimes occluded; and the urine undergoes changes incidental to decomposition. Small quantities of blood, pus, and mucus frequently appear in it; and, instead of the normal acidity, it is voided in an alkaline condition. Under these circumstances, it is possible, and even probable, that the inflammation may progress upwards, affecting the ureters, and, finally, one or both kidneys. And it often happens that the Cystitis excites a reflex pain in neighboring organs, sometimes in parts at a considerable distance from the original seat of inflammation.

The treatment essentially consists in affording the bladder as much rest as possible, and in other ways allaying the inflammation. But to give rest to an organ constantly in use, night and day, must prove a somewhat difficult task. It has been recently ascertained that part of the intestinal mucous membrane excretes urea, and that a portion of the kidneys' work may be performed by the intestine. Perhaps this explains why saline laxatives often alleviate the pain attending Cystitis. Dr. Skene, of Brooklyn, L. I., relates a case where a lady patient "had a catarrh of the bladder of some months' standing, which I had been treating in the usual way with only slight benefit. She was one day attacked with cholera morbus, with serous purging and vomiting. The effect for a time was to almost suspend the action of the kidneys. When she recovered she was delighted to find that her Cystitis had left her."

Quite recently I have had a case of my own somewhat similar. Mine occurred in a married man with a severe gonorrhea, who was seized with typhoid fever, and after the usual watery stools for two days the urethritis abated, and

the consequent discharge entirely stopped. He took the Iodide of Phenol mixture every four hours; but I do not imagine that that had anything to do with the cure of his gonorrhea which had only been running a few days, — less than one week. I attribute this reflex cure to the diarrhea.

Chronic Cystitis furnishes no exception to the general rule that each case should be studied separately, and the treatment modified according to individual peculiarities. Idiosyncrasies, in fact, seem to affect the bladder even more than other organs; and in women more than in men, age must be taken into account. Before puberty, during the child-bearing period, and after the menopause, constitute eras during which bladder affections essentially differ. The following interesting (personal) case belongs to the last-mentioned period.

I first visited Mrs. Blank at her home in Lynnfield, Mass., Dec. 26, 1887. She is a married lady, with a grown-up family, about sixty-three years of age, who had always enjoyed good health until 1884, when she began to suffer pain in the bladder, accompanied with frequent calls to urinate, night and day. During the whole three years she has never been able to retain her urine for more than an hour at a time, and sometimes she was obliged to use the vessel every half hour or so.

Mrs. B. had been under the care of several physicians, regular and irregular. Although naturally of a placid, happy disposition, her face showed marks of suffering and anxiety. Pulse 85; temperature, 99½°. Her urine, drawn with a soft catheter, contained pus, mucus, and crystals of the triple phosphates. There was no uterine or ovarian disease.

At my second visit, a small caruncle, growing at the lower edge of the meatus urinarius, was removed by means of a wire snare, and the raw surface painted with Iodide Phenol. A similar but smaller growth was found at the

neck of the bladder. After swabbing the urethra with a four per cent. solution of cocaine, this was cauterized in the following manner: The lower third of an English gum catheter (No. 7) was cut off, stuffed with a morsel of surgeon's cotton at the distal end, saturated with Lugol's solution of Iodine, and fitted with an extemporized wooden piston. This greased catheter was passed through the urethra until the small oval opening was opposite the growth; then the piston was pressed backward, and the solution thus applied to the growth exclusively.

For a period of six weeks, she took a tablespoonful of the following solution every four hours during the day; and also used it as an injection into the bladder every night and morning. Infusions of Buchu or Triticum repens were used as a drink, *ad libitum.*

℞	Benzoic Acid, pure	℥ij;
	Biborate of Soda	℥iv;
	Distilled water	℥vi.

Misce.

Afterwards, during the treatment, the same quantity was taken twice a day. I found that she had refrained from drinking water as much as possible, under the mistaken notion that it would aggravate her sufferings. She was told to drink water, or its equivalent, freely, in small quantity at a time. She took Lithia water as a drink for several weeks, with apparent benefit. All kinds of fermented liquor were absolutely forbidden.

Her diet was carefully regulated. Salt meat, salt fish, pork, lobster, beans, highly spiced soups, fried food, and pastry were prohibited. In addition to her regular meals, she was instructed to take a small cupful of hot milk or gruel at bedtime. She relished Mrs. Lincoln's potato soup, in a modified form, — a recipe I can heartily recommend in

such cases.* The common practice of soaking beef-steak with butter was interdicted.

The usual directions were given to overcome constipation, namely, — a regular hour daily; massage in the track of the ascending, transverse, and descending colon; oatmeal porridge at breakfast; and occasionally a small dose of Phosphate Soda in sufficient water.

Attention was paid to position in bed, by raising the pelvis with graded cushions, so as to avoid contact of the urine with the *trigonum vesicæ*, the most sensitive spot in the bladder. During the first two weeks she remained most of the time in bed, to secure the benefit of rest. Within three weeks the pain had much abated, and also the frequent desire to urinate. At the end of six weeks the urine was free from pus and triple phosphates, and it could be retained about two hours.

After one month's treatment I saw her only weekly; and in May, 1888, she considered herself cured. The Benzoic Acid injections were administered by her daughter occasionally till the following August.

As the bladder had become much contracted, I made an attempt, towards the close of the treatment, to dilate it by means of tepid salt water from a fountain syringe, beginning with three fluid ounces, and continuing these injections twice a day until the bladder could hold about a pint. After a few trials, this process was intrusted to the patient's daughter, who faithfully carried out my directions. Dilatation should be effected very gradually. There is some risk of paralysis from overdistention; and it seems possible, when

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*Take 3 potatoes. 1 pint milk. 1 teaspoonful chopped onion. 1 teaspoonful salt. 1-2 saltspoonful pepper. 1-2 tablespoonful flour. 1 tablespoonful butter.

Wash and pare the potatoes, and let them soak in cold water half an hour. Put them into boiling water, and cook until very soft. Cook the onion with the milk in a double boiler. When the potatoes are soft, drain off the water and mash them. Add the boiling milk and seasoning. Rub through a strainer, and put it on to boil again. Put the butter in a small saucepan, and, when melted and bubbling, add the flour, and when well mixed, stir into the boiling soup. Let it boil five minutes, and serve very hot.

If the soup be too thick, add more hot milk.

the ureters are abnormally dilated, that the kidneys themselves may be injured.

This brief report would not be complete if I failed to call attention to the potent efficacy of hygienic, comfortable surroundings, admirable nursing, and a cheerful frame of mind on the part of the patient. At my first visit, she remarked that her patience was almost exhausted; but I found a good stock still on hand, and a feeling of rational contentment, which greatly assisted her physician in the subsequent treatment. Unreliable patients, whose word cannot be depended upon, constitute one of the severest trials we are subjected to. When we meet with a thoroughly honest woman, who intelligently follows our directions, half the battle is fought, and we know what we are about. On our part, I think that it is a physician's duty to explain his orders as well as he can, and so enlist her valuable co-operation.

DISCUSSION.

Dr. Henry M. Field testified to the interest with which he had followed the reading of Dr. Brown's paper. Was especially struck with the allusion to the relief or cure of gonorrhœa by the revulsive action of a sharp hydragogue cathartic influence brought to bear upon the bowels; because this practical point in therapeutics was seldom illustrated. Some years ago a quack in Paris coined golden opinions and guineas by the use of an anti-gonorrhœal specific, which, upon analysis by Fabre, was found to consist of a Tincture of Colocynth. Fabre's method consisted in giving the patient half a tablespoonful of the tincture (one ounce Colocynth pulp macerated in one pint hock or sherry) before breakfast every morning; this omitted every fourth day, and the treatment continued until twenty-seven to thirty doses had been taken. Dr. Field had had success with this remedy, when the balsamic treatment alone had failed. The patient is thereby cleaned out, not alone as to the alimentary canal, but in blood-vessels; and the bitter of the tincture served as tonic and eupeptic. The application for similar principle in chronic cystitis is obvious.

He was surprised that Dr. Brown had not made allusion to the use of balsamic remedies. Dr. Field, for years, had made large account of turpentine and sandal-wood oil. The very necessity of their elimination — their resinous matter being carried out of the system through the kidneys—assumed a local action of a partly counter-irritant and alterative character upon the cystic mucous membrane. They were not adapted to acute Cystitis, but were very effective in the chronic variety of the disease. Quinia acts in much the same way. Dr. Field's first discovery of its virtue was an accident. He gave it to a patient who was nearly cured of inflammation of the bladder, but had reached the stage when he seemed to be standing still, simply as a tonic. The quinia took hold upon the bladder at once, and apparently completed the cure.

Dr. A. P. Clarke said that, in the main aspects, he coincided with the reader, especially in his remark that he had rarely seen cases of acute cystitis following childbirth. Retention of urine does often occur after laceration of the cervix and other injuries. Cystitis also follows caruncle, fissure of the urethra, and gonorrhœa. Cases of idiopathic cystitis are not as common as has heretofore been believed. Cystitis often results from falls, blows, flexure of the uterus, great distention of the bladder, and unskilful employment of the catheter. The extension of inflammation from vulvitis and vaginitis is an occasional cause of vesical disturbance. So also is the increased vascularity in the parturient woman liable to produce over-distention and vesical inflammation. He regarded the mucous coat of the bladder as most sensitive to inflammation; thence the inflammation is liable to extend to the other coats and adjacent structures. Sometimes the disease extends to the ureters, the kidneys, and peritoneum. Under such circumstances treatment will often prove quite unsatisfactory. He is accustomed to use the hot-pack, hot douches, and baths. Electricity (in the form of Faradism), with one pole near the urethra and the other over the bladder, gives relief after the lesions have been attended to. Saline laxatives and mineral waters sometimes help. Bland diluents are of the greatest benefit, especially where the urine is loaded with abnormal products. Opiates are to be avoided as much as possible, and, when used, their local employment is to be preferred. Benzoic acid, in combination with borax,

mentioned by the reader, is an old remedy, but it has been a favorite one with the speaker since its endorsement by Dr. Emmet several years ago. Washing out the bladder is often of much benefit; but extra care should be exercised lest the mucous and muscular coats (which have frequently undergone degeneration) be overstrained, and permanent injury follow.

In cases of protracted inflammation, washing out the bladder with a solution of Nitrate of Silver (thirty grains to the ounce) often yields excellent results.

Attention should also be given to the diet. Butchers' meat should generally be avoided, as it is liable to increase the urates and other morbid products which irritate the urinary passages.

Dr. Clarke had seen a few cases following delivery; but there was generally a previous history of catarrh in the bladder or gonorrhœa. In one case a large calculus was found in the bladder.

Dr. Emmet's operation for an artificial vesico-vaginal fistula is a valuable expedient in severe cases.

Dr. Clarke also mentioned a case in his own practice which was permanently relieved by rapid dilatation of the urethra. Since then he has continued to resort to that method in cases where tenesmus is a marked feature, and where the parts around the meatus are contracted and hypertrophied.

Dr. Otis E. Hunt asked the reader if an attack of Cystitis occurring a week after delivery in a forceps case would not be called Acute Traumatic Cystitis? [Answer by Dr. Brown: Yes; but I have not seen one.] Dr. Hunt said that he has seen it several times. Little benefit can be obtained except, —

a. From position, which should be horizontal, with the pelvis a little elevated.

b. From the hot pack (especially in an attack of Acute Cystitis). A napkin, folded in several thicknesses and of sufficient size, is wrung out of hot water and placed on the abdomen over the bladder. This should be covered with rubber tissue, and this in turn with several thicknesses of flannel, covering a considerably larger extent than the wet napkin itself, and the whole held in place with a bandage. It should be changed twice a day.

c. From continual drainage. For this purpose the hard rubber catheter has failed; but a soft rubber male catheter of large size, introduced with the aid of cocaine, and retained by plasters

around the body, serves an excellent purpose. This may be retained for weeks, the end of the catheter being put into a bottle, which may be kept in the bed to catch the urine.

d. From internal irrigation through the kidneys. Large quantities of water must be drunk. The patients will not take Cochituate or other common water, but they will drink two or three quarts of Poland water. This not only dilutes the urine, but it actually washes out the urinary tract.

e. Also from external irrigation, which is done by attaching to a fountain syringe a catheter with a forked tube, provided with a stopcock. The bladder is first filled; but should not be too much distended, and then it is allowed to run out, and the bladder is again refilled. This is repeated for ten or fifteen minutes. For the irrigation fluid plain water is used, or a little borax may be added. The temperature of the water is a very important point; before stating the degree that he considered best, the speaker asked Dr. Brown what temperature he preferred. [Answer by Dr. Brown: Blood heat, *i. e.* about 100° F.] Dr. Hunt said that he also considered this to be the proper degree, and he has seen harm result from the use of water of too low temperature.

He has not derived much benefit from internal medication. In the later stages, he uses buchu, but does not believe that it does much good except as a placebo.

Dr. J. F. Frisbie said that he had not had much experience in this class of cases. The last case he saw followed a very severe childbirth. In reply to his questions he was told that the woman had passed urine freely. On the third day there was much pain, and then he found out that there had been only dribbling. She had acute Cystitis, which lasted fourteen days. He prescribed Sulphate of Magnesia, and she drank Apollinaris water freely. The wet pack was used, and there was a good recovery.

Dr. L. F. Warner said that this class of cases is one of the most difficult that he has been called upon to treat. He has seen a great many cases of acute Cystitis, and he believed that most of the chronic cases were once acute. He thought that Dr. Hunt's treatment was good, but that it alone would not cure very bad cases. In acute cases he always gives calomel, Dover's powder, and hyoscyamus. Fifty years ago dependence was largely placed

on derivatives in the treatment of gonorrhea. Epsom salts were always used, and the patients learned to expect them.

In chronic Cystitis he had obtained the best success from the use of irrigatives, and he prefers a solution of Corrosive Sublimate, followed by Iodoform. He uses a double canula with a stockcock, and a fountain syringe. He first washes out the bladder thoroughly with water at 100° F. The bladder is gradually filled with water till the patient begins to complain, then the stopcock is opened, and an outflow is made, while at the same time the Corrosive Sublimate solution is allowed to run in. It is quite important to keep the bladder distended, so that the fluid may come in contact with all portions of the mucous membrane. The irrigation is continued for some time, and is followed by an injection of Iodoform which is left in the bladder. The urine should be kept as nearly neutral as possible. In reply to the question as to the strength of the solution of Corrosive Sublimate that he would recommend, Dr. Warner said that the sensibility of patients varies: one will bear 1 to 5,000, while others will not bear 1 to 10,000. He begins with a weak solution, and feels his way along. Sometimes a douche into the bladder of a solution of quinine (*e.g.*, a drachm to a pint of water) will give much relief. A solution of the "sugar of lead" was used in one case. He emphasized the importance of getting the system into as good a condition as possible to secrete healthy urine.

Dr. Frisbie asked if it is especially advantageous to have the water boiled before using?

Dr. Warner: I don't know about that. It is always easier than to bear cold water.

Dr. Hunt asked if frequent micturition is not often relieved by drainage by means of a retained catheter?

Dr. Warner replied that that is true if the patient can bear it. The effect of cocaine, which has been suggested, is not lasting.

Dr. W. S. Brown emphasized that the continued use of cocaine is dangerous, on account of its constitutional effects.

Dr. F. L. Burt said that this is a most important class of cases, and one most difficult of treatment. Some cases can only be cured by making an incision into the bladder through the vagina *i. e.* by making an artificial fistula, and thus securing

drainage. Irrigation is an important factor in the treatment. In one case, a douche of Corrosive Sublimate (1 to 2,000) cured a Cystitis of twenty years' duration. Some cases, however, are not apparently affected at all by the irrigation. He has lately seen a case in which a 1 to 500 solution had no effect. He believes that one important cause of Cystitis is the continual flowing over the meatus of a 1 to 2,000 solution of Corrosive Sublimate for an operation. To avoid this, after commencing with the sublimate solution, he concludes the operation by substituting hydronapthol.

Dr. J. H. Woods said that he saw a case two years ago that was cured by the use of Poland water. The young man had had an attack of gonorrhea, and he was passing very acid urine. Alkalies were administered without any effect. After a time he passed into the hands of a homœopath, who flushed him with Poland water and cured him.

Dr. A. L. Norris had seen a few cases following difficult labor. He had been accustomed to treat them with irrigation, for which he employed a double silver catheter. These douches were given twice a day for several days, with excellent results. Hot fomentations are of benefit, as also are alkalies and anodynes given internally.

Dr. Hunt asked if the catheter had been used in these cases before the Cystitis had appeared?

Dr. Norris replied that it had; but that he was accustomed to use a new catheter for each patient.

Dr. Hunt said that he had a suspicion that many attacks of acute Cystitis were caused by the introduction into the bladder of foul discharges from a catheter that had not been thoroughly cleansed after using.

Dr. Burt said that the catheter was a very important factor in the causation of Cystitis. Many old men use their catheter several times a day, lay it upon their bureau, and have no bad results; but women cannot do so. Not only must their catheter be carefully cleansed, but the external parts must be washed.

Dr. Norris never had thought it necessary to wash the parts before using the catheter in a parturient case; but he thought the point worthy of consideration.

Dr. Burt thought it a good plan to wipe the meatus with

cotton wet with some antiseptic solution, and then press it down so as to separate the vulva, and leave it there.

Dr. Helen L. Betts referred to attacks of vesical irritation due to pressure of the clothing, which were relieved by the removal of pressure and weight.

Dr. Hunt wished to emphasize the point noticed by the reader of emptying the bladder as often as the desire occurred.

Dr. S. N. Nelson said that the urine in Cystitis contains a greater or less amount of pus in the sediment, and there is present a small amount of albumen proportionate to the pus. Bacteria termo are found in great numbers.

The most important factor in the causation of Cystitis, whether in man or woman, is the introduction into the bladder of bacteria, and, as a consequence, a fermentation of the contents of the bladder is set up. In this way may be explained most of the cases which have been referred to as occurring during an attack of gonorrhea, or after labor.

The means by which the germs are most commonly introduced is the catheter, which has not been properly cleansed. To avoid this, it is a good plan to soak the soft rubber catheter in a solution of Corrosive Sublimate (1 to 2,000) before its introduction; and, in the case of a patient who requires its use constantly, it may be left in soak when not in use. The meatus and vulva of the woman should be carefully cleansed with sublimate solution before the introduction of the catheter, and it is always a good plan to bring to aid the sense of sight when passing the catheter. If, unfortunately, in spite of all these precautions, an attack of Cystitis is induced, or if a case is seen where the chronic stage has been reached, I believe that more good can be done by local than by systemic treatment.

In acute Cystitis, the drinking of large quantities of water so as to flush the uriniferous tract is an excellent procedure. It matters little in what form the water be taken, so long as the quantity is large. The imbibition of mucilaginous substances is desirable; and for this purpose flax-seed and slippery-elm teas are to be recommended. As an adjuvant, the neutralization of the urine until litmus paper no longer turns red is a great comfort to the patient; for, in acute Cystitis, the urine has become unduly acid, having undergone the acid fermentation in the bladder. This is easily effected by administering Citrate of Potassium.

Local treatment, however, is the most effectual, both in acute and in chronic Cystitis; and for this purpose irrigation by means of a double tube catheter of soft rubber is the best. The irrigation fluid should be a solution of Corrosive Sublimate as strong as can be borne. This will vary from 1 to 10,000 to 1 to 2,000, according to the temperament of the patient and the condition of the mucous membrane of the bladder. The water should be boiled to kill the germs contained therein, and then cooled. In acute Cystitis, a solution of boracic acid may be advantageously employed for half an hour to an hour, in order to thoroughly cleanse the inner surface of the bladder, and the irrigation may then be completed with the sublimate solution, which should run from ten to twenty minutes. The irrigation fluid is most effectual when somewhat warmer than blood heat, say about 102° F. After washing, the injection of an emulsion of Iodoform is a good thing. The irrigation may be employed as above, once or twice a day, in aggravated cases.

Dr. H. C. White referred to the case of a man, about 58 years of age, who, for the last six or eight winters has been confined to the house with rheumatism. Three or four weeks ago he had much difficulty in passing urine. The urine comes thick and muddy when it commences to run, and then issues clear. Internal irrigation with much water, he believes to be excellent treatment.

Dr. W. S. Brown, in closing the discussion, said that he had left out the surgical treatment in his paper. There are many cases in which it is necessary to open the bladder by making an artificial vesico-vaginal fistula. This is good practice in hospitals, but it cannot be carried out so well when the patient is at home. Dilatation of the bladder should be carefully and cautiously attempted, because in some cases the bladder wall is thin, the mucous and muscular coats have disappeared, leaving only the serous coat, and rupture may occur after even moderate pressure.

THE DRESS OF WOMEN: ITS RELATION TO THE

Etiology and Treatment of Pelvic Disease.

BY HELEN L. BETTS, M.D.

OF BOSTON, MASS.

Read December 15, 1887.

THERE are certain conditions of degeneracy which come to prevail in countries and among communities which strike at the root of vitality, and therefore of beauty and usefulness. The changes by which such conditions are effected are not sudden or forced. They creep on gradually in apparently legitimate ways, and many generations may slip away before some sage thinkers more observant than the rest, or whose individual interests have been more closely touched, open wide eyes to find a relentless hand is upon the throat of the dearest interests of home and country. And these results do not come of malicious intent. Ignorance of the relation of cause and effect, and lack of thought, are often as powerful for evil as deep-plotted mischief.

This is evident in the damaging results now seen in sections of country which depended upon the heavily timbered uplands beyond for their moisture and streams. The pioneer learned too late that the pines and cedars were the gentle persuaders of the rain, and so the mainsprings of agricultural prosperity; and now millions of money and years of planting cannot bring back this rain-factor, or the stalwart beauty which was ignorantly sacrificed.

This is not an inapt illustration of the harm which woman is doing to-day both to herself and posterity by her unhealthful dress. It strikes a paralysing blow at vitality,

beauty, and usefulness. We need not look back beyond the work and observation of to-day to know that there is a radical wrong somewhere in woman's environment which tends to degeneracy. Perhaps the index to woman's physical status can be best obtained by noting the medical literature devoted to woman's diseases. There are systems of gynecology, American and foreign, which in themselves make whole libraries. Gynecologists and gynecological societies are multiplying in every section of the land. *Where so much remedy is needed there must be great disorder.*

Is this a necessary condition? Was woman born to invalidism? With the lower mammalia this is not so. The female is quite as hardy and enduring as the male; and careful study shows there is nothing lacking in woman's anatomical structure which prevents her from being vigorous, or even powerful. But the fact remains that our women, as a rule, are delicate, with little power of endurance. They bear with difficulty one, two, or three children; then are faded and nervous, and finally drop into the large list of patients who have uterine disease or nervous prostration: or, if they have neither of these, they *think* they have, which indicates quite as unsound a condition of body and mind. Why should not woman grow hale and hearty with years, like their brothers and husbands?

It is not fair to say that any one factor effects all this wrong. Much can be said of early crowding at school, irregular meals, indigestible food, late hours, imprudence at the menstrual period, untrue husbands, and fast living generally; But if women brought to life's battle a properly developed physique, all these conditions combined could hardly effect such complete wrecks as often drag themselves into the office of the specialist. From a robust body most of these blighting influences would rebound, leaving it still symmetrical, unmarred.

No vigorous girl would be overtaxed by our ordinary school-studies. Wholesome tiredness would send her early

to bed. A healthy appetite would find no satisfaction in caramels, limes, croquettes, and nondescript entrees at all hours. A woman with a sound mind in a sound body would be too sufficient to herself to make an alliance with one who lacked truth and honor. A healthy, positive nature would find nothing satisfying in hot-house society life, where social evil generates and thrives. Still,—acknowledging these other unwise conditions, let us take this one factor, dress, and see what its physiological, or rather, pathological bearings are.

In early life girls are as vigorous and healthy as boys; but as a rule they are taught indoor sports. When they should be romping and climbing in the open air, developing bone and muscle with which to meet the needs of mature life, they are keeping tires clean, nursing dolls, and being taught to be lady-like! But provided girls are taught and allowed climbing, running, ball and tennis, they can obtain but a small part of the good they might gain because their *movements are restricted.* If a girl climbs she catches her skirt and is pulled back; she tears her dress, and is scolded for being a romp.

Before a boy is six years old he is relieved of skirts, and the boy's real joy in his first pantaloons is not simply pride in being dressed like a man; it is a natural, happy outburst at being free. Now he can leap, run, turn summersaults, or stand on his head. There is nothing to catch, chafe, or hinder. His close garments are a part of himself. No wonder the boy in his first pantaloons is exultant.

Up to ten or twelve years, a girl can walk with comparative ease, if she cannot climb. But now the lengthening of her skirts increases her bondage. Just as every line and muscle is rounding with nascent strength and beauty; when Growth is giving generously to the most active members, and Development is fast widening or limiting the relative power and skill of each system in the organism, what is every girl taught to do? She decorously confines the limbs

by heavy clinging drapery which impedes every movement. Each step is checked by the muffled friction of soft, pliant skirts that sway and wrap about the calves and ankles, hold her back from rapid walking, and make running exceedingly difficult. The result is that all exercise involving rapid and extended movements of the thighs is gradually abandoned. Now this girl is the prospective mother of the next generation. The pelvic bones and ligaments, muscles, and fascia are in process of development, and this is a momentous period. It matters not, Custom and Fashion say "Long skirts"; so the limbs are pinioned.

Now what becomes of the Obturators, the Transversalii, the Levators; and the Sphincters? Their proper development cannot come save through vigorous action; daily systematic, energetic exercise, which brings into play the back, thighs, and abdominal muscles. No one who has dissected a pelvis, or studied those magnificent plates of Savage's, can doubt that woman is fully equipped for rapid, easy, and safe parturition. Then why does woman dread childbirth as cities dread the earthquake? Because she knows that in the last dread throes the foundations are often literally torn away. And why? Simply because all those pelvic belongings are allowed in early life to lie dormant, undeveloped. The forces that Nature has appointed as a reserve corps at both flank and rear, to lengthen and strengthen the perineum in the last minutes of extreme pressure and tension, are unused and unskilled, so they do what untrained members usually do when brought to the crucial test: they fail, and the perineum is sacrificed. Where lies the blame? So long as woman wears long, clinging skirts, she cannot, as a rule, reach that point in physical development that makes child-bearing safe or desirable.

A mother lately complained to me that her little girl was learning slang by playing with boys. She ran in, shouting, "Mamma, Bob stumped me to shin up the piazza post, and I did it, too." My counsel was, "Forgive the

slang, provided she shins up the post successfully." It is this lack of bodily freedom that makes woman fragile. She may have no disease, she may call herself well, but we have Health and Health, or *wholthe*, as the old Saxon has it. Health may simply allow its possessor to follow comfortably a quiet, uninterrupted, routine life. By living carefully, and guarding against extravagant outlay, the body may answer all moderate requirements without sickness or pain. Life is a calm, unimpassioned, monotonous existence. Or, health may make life a glad song of joy. Every faculty is tense and keen. Simple existence is a luxury. Eating, drinking, sleeping, are physical delights, and breathing is literally a constant inspiration. This is what was intended, and what is possible; but it can only come with robust health. Whatever checks Growth and Development cuts off the possibility of a vigorous physique, and also the main avenue by which the most healthful influences reach us.

I have seen women in mature life whose fragile, half-developed bodies have set relentless limits to physical and mental enjoyment. They looked out, as from grated prison cells, upon the spontaneous, active life which was once, but is now no longer, possible to them.

> "The moving finger writes, and having writ
> Moves on; nor all their penitence or wit
> Can lure it back to cancel one half line,
> Or all their tears wipe out one word of it."

There is another feature quite as objectionable. While the long drapery dwarfs the body and lowers its vitality, the corset, with unsupported skirts, induces actual disease.

The prevailing style of dress allows all the weight of clothing below the waist to rest upon the abdomen and hips. As the point of greatest projection of the viscera is higher up than the hips and more prominent, this part forms the main support; consequently there must be com-

pression, with displacement of the abdominal viscera, and a corresponding degree of disturbance of blood-supply and nutrition. This often gives rise to a condition of the uterus that for a long time was covered by the term inflammation, but that has been elaborated by different authors according to their ideas of pathology, and now we have the engorgement of Lisfranc; the irritability of Hodge and Gooch; the active congestion of Chapman; the passive congestion of Emmet; Kolb's formative irritation; Hewitt's abnormal nutritive activity; the areolar hyperplasia of Thomas, etc.: all agreeing that there is abnormal cell proliferation.

We will for clearness adopt a term in every-day use, — congestion. What follows a long-continued congestion?

First, disturbed nutrition of tissue; second, altered function; and with these two conditions, without the aid of another single cause, we have the factors of nine-tenths of the disturbances that gynecologists are called upon to treat. Let us see if this statement is too broad.

Congestions, displacements, flexions, glandular enlargements, erosions, excessive and altered secretions, naturally arise from prolonged compression with displacement. What of lacerations of the cervix? Is it not most probable that the muscular fibres of the cervix, during a long-continued congestion, may lose their resiliency, become fragile, and so easily torn during the prolonged and violent dilatation of parturition? Would not dropsy and apoplexy of the ovarian follicles be a natural result of prolonged and excessive hyperæmia of the ovaries and tubes, which, together with the uterus, share in the general compression and stasis of blood? Do not the histological researches of to-day point strongly toward the congestion theory as being the most rational by which to explain fibroid growths? Among pathologists we may speak of our country-woman, Dr. Mary Putnam Jacobi, as worthy authority; and her investigations all go to show that in subinvolution venous congestion is the etiological

factor where, without the arterial hyperæmia necessary to inflammation, we have the venous hyperæmia necessary to growth. Upon this ground it has been suggested that the frequency of fibroids in the posterior wall of the uterus may be explained, the constant pressure from the crowded rectum causing venous hyperæmia, the potent factor in fibrogenesis.

However, it is not necessary to trace all uterine disease to congestion, in order to make attention to dress imperative. Observation, with ordinary reasoning, without a knowledge of pathology, teaches that great injury must be caused by continued weight and pressure. With this fact granted, it is hard to understand why it is so generally ignored. In other disturbances of the organism the environment is always taken into account in the treatment. We not only use remedies which relieve, but we remove influences which have brought about or which increase the disorder. What results from treatment could we expect in typhoid fever, even with the most approved remedies, if the patient breathed sewer gas day and night? Or, in a case of nervous prostration, in a teacher who spends her days in an ill-ventilated schoolroom and her evenings in correcting examination papers? Could we expect brilliant results in gastritis with a patient who breakfasts on fried pork and buckwheats, and dines on corned beef and cabbage? Would he be a scientific surgeon who would apply a soothing disinfectant to a compound fracture of the humerus, and then leave the arm unguarded to dangle loosely in the coat sleeve? But is not this as consistent with the first principles of medicine and surgery, as it is to expect successful results from pessaries and depleting applications to the uterus, while the patient is steadily pushing the abdominal contents upon and into the pelvis, with from four to twelve, and often twenty, pounds of pressure? If it is reasonable and scientific to regard diet in indigestion, mental and social influences in neurasthenia, atmospheric

changes in pulmonary disease, is it not quite as rational to regard the force of gravity in uterine disease? And yet it is often left entirely out of account in the matter of treatment.

A lady came into my hands for retroversion with enlargement, and, of course, prolapsus. This condition had been first recognized six years before. She had been under the care of a specialist from time to time ever since. She had had everything commendable in the way of applications, douches, and pessaries; but she wore the usual weight about the hips, and she had never been at all enlightened concerning its hurtful effect. Her physician had exhausted all resources in the line of internal supports in trying to raise up the large and heavy uterus, while all the time a firm pressure of several pounds was pushing it into the pelvis. For this patient, like very many women, had lost the dorsal curve, and so the body was carried at such an angle that the whole weight of the abdomen was precipitated directly upon the pelvis.

Some months ago a gentleman came to the office, and when I saw his sad, worn face, and heard his pathetic voice my mental diagnosis was: This man has either dyspepsia or an invalid wife. It proved the latter. She had been ill two years; nine months in bed; but had finally convalesced to that degree that she could sit up for two hours during the day. She was assured that all she needed was strength; but, as for several weeks she had been losing ground, she and her husband were facing bravely the grim fact of invalidism for an energetic wife and mother of thirty years old. Her illness really began with subinvolution six years before. For four years this continued, with constipation and the usual half-invalid condition. After severe exertion, during sickness in her family, she was obliged to take to her bed with acute uterine congestion. Soon after mucous polypoid growths appeared; a surgeon from the city was called, and an operation performed. Later, the retroverted uterus was

replaced with a sound, which operation was followed by prolonged hemorrhage. After nine months in bed, a naturally strong physique came to her rescue, and she regained her feet. But she had constant pain in her back, head, and limbs. She was wakeful, her mind easily confused and depressed. The uterus was engorged; all the pelvic organs were crowded as low as the floor of the pelvis would permit, and were in a state of intense hyperæmia.

The first indication seemed to be removal of the superincumbent pressure; so, as usual, I examined her mode of dress. You will be interested from a professional standpoint to know what this patient wore. I examined her at home, so she had on simply her indoor garments. They were, knit and muslin drawers, flannel and muslin underskirts, hoop-skirt, and bustle, then a muslin and a dress skirt, seven bands; fourteen thicknesses were buttoned closely about the corset; and, not long before, her physician having noticed that she wore her garters about her legs, said he feared they would interfere with the circulation, and advised that she should put an elastic band about the waist and fasten the stockings to this! I asked if her clothes were not oppressive. She said she thought she wore very light clothing, but had noticed at night a purple crease about the waist where the bands came about the corset, and wondered if that could keep her from gaining strength. With all this weight and compression, this poor woman was waiting to get well, wondering why she could not stand, that her limbs ached and prickled, and why she could not walk without getting so tired. Neither physician nor specialist had spoken to her about her dress.

Her recovery — for now, at the end of five months, the patient is virtually well, her bowels move without aid, she walks, rides, goes to church, eats and sleeps like other people, directs her house, is happy and bright, and the husband is as cheery as the wife, — her recovery was brought about in the simplest manner. She took off her corset, and adopted

under-garments without bands. She took gymnastic exercise regularly; two or three times a day she assumed the genu-pectoral position. The medical and local treatment I consider unimportant, compared with the changes of habit. This consisted in the ordinary means for restoring tonicity to the intestinal tract, with the usual uterine applications.

These cases will serve as an index to an interesting experience which has convinced me that there is a reason not generally recognized why our brothers in the profession, and in the flesh, pass over so lightly the subject of woman's dress in their practice and teaching. Men who have won enviable places in the profession, both as authors and workers, dismiss the subject with a few lines. In the "Cyclopedia of Gynæcology" published lately by Wood, consisting of eight volumes, it would be hard to find one-half page that refers to woman's dress. In Prof. Munde's excellent handbook on "Minor Gynæcology," in two hundred and fifty pages upon the treatment of displacements, only two lines enjoin removing the superincumbent weight from — *not the uterus*, but the *pessary*, that *it* may not be displaced! He describes and gives illustrations showing over seventy different pessaries and abdominal supporters, which are made from leather, cotton, kid, hard rubber, celluloid, glass, whalebone, and cedar wood. In speaking of abdominal supporters, he advises that *they* be suspended from the shoulders, and gives an illustration of an apparatus made of a metallic rim which shall rest on the hips and be suspended from the shoulder. To this, with the skirts, he remarks parenthetically, the abdominal support is to be attached! The picture is almost pathetic; and, with a knowledge of Prof. Munde's love of mechanics and skill in contriving, it is simply astonishing.

The situation will admit of but one explanation. Patients often ask, What do you think is the reason my physician did not tell me about my clothes? There is but one answer: Because he did not know. But why should he not

know? Physicians know how women dress. Oh, yes; but he never, *in his own body*, felt the bondage. Nothing teaches like experience. No surgeon is so thoroughly aseptic as one who has seen the germs grow in the culture tube and demonstrated them under the microscope. He has seen with his own eyes, and knows he has an actual factor to deal with; and there is nothing that would so effectually convince physicians of the immense agent for harm that women's dress is to women, and so to the race, as a little individual experience. You need not put on a fashionable calling suit, with braid and jet, which would weigh from ten to forty pounds, the waist of which must be put on after the bonnet and gloves; for after it is fastened, the arms are literally pinioned. This would be extreme. Take an ordinary working suit, not omitting the high-heeled, narrow-toed boot. You would then have from four to ten pounds slipped snugly down over your corset, with yards of drapery outside and beneath, swaying and twisting about your limbs. Go about your ordinary work, which involves no more active movement than woman's work. Feel the clinging friction at every step; have a hand always ready to hold your skirts from your own and others' feet as you go up and down stairs; get in and out of your carriage; walk across Boston Common in a stiff breeze — this for one day only. Three items I would confidently vouch for in the outcome: —

First, Most righteous, but undignified rage.

Second, Rending of raiment.

Third, You would never attempt to treat a patient for displacement, or congestion, or vesical irritation, without first working a reform in her dress.

It may be said that women are used to their dress, and so do not mind it. "'Tis true, 'tis pity — pity 'tis, 'tis true." The majority of women know no more of bodily freedom than the domesticated canary or parrot. But the fact does not make them any more efficient or happy members of

society, or fit their half-developed bodies to produce a hardy progeny. Perhaps some lack of effort in this direction may be due to the fact that it is exceedingly difficult to persuade women to make radical changes in their dress. They will tell you that their clothes are not tight, they never lace, they can turn round in their corsets. Their clothes, indeed, are quite comfortable. They would rather take medicine for the congestion or the constipation, or most usually both: and, in the pressure of daily work, when I see that only a round half-hour's talk, with blackboard illustrations, and full directions for the entire change of dress, will effect a conversion, I have given the patient the desired bottle of medicine, pocketed the fee, shut the office door, with a groan over the hopeless condition of the patient, and, let me add in self-defence, a groan over my own shiftless treatment.

Were this matter not one of vital moment, in view of the unwillingness of women to make the necessary change, we might, with some peace of conscience, leave these miserable women and girls to their unhealthful dress, treat them as so many emergency cases, whose lives are to be comforted and eked out in a superficial from-hand-to-mouth way. But this is *not* a side issue. No fact in biology stands better proved than this, that change of function is followed by change of structure. With diminished exercise comes diminished size and development; and the dwindling of a little-used part has, by inheritance, become more and more marked in successive generations. This opinion, in his later life, Mr. Charles Darwin was careful to keep constantly in view. Although the especial factor of natural selection, which he first recognized, still held its ground as playing an immense part in organic evolution, he repeatedly stated that great weight must be attributed to the inherited effects of use and disuse, with respect to both mind and body. If these are facts, what sort of a race will the half-developed, half-furnished pelves of to-day bring forth? Is it inevitable that the children of culture and intellect must be always puny and sterile?

If history must repeat itself, can we not, by earnest, wise effort raise the next cycle to a higher plane than this?

The matter of women's dress is one in which public opinion has a powerful influence, especially the opinion of men. Women dress not for their own comfort, or the health of posterity, but to please their brothers, their lovers, and their husbands. Men could wield a mighty influence for good in this work if they only realized its importance. As man has a more extended field for observation, woman has come naturally to regard his opinion with deference.

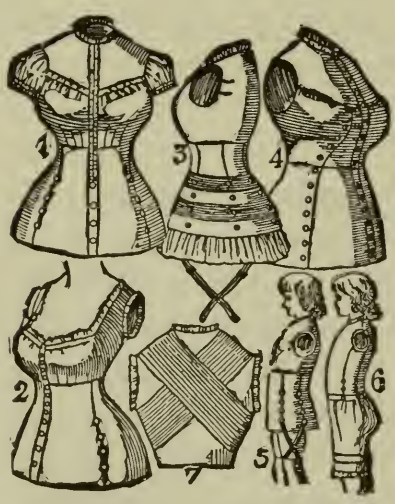
Women physicians, especially, work here at a disadvantage. With most women, save those in the advance ranks of thought, any suggestion in the way of hygiene in dress is immediately branded as Dress Reform; straightway the masculine, pantaloon-type of radical dress is brandished, and they say, What else could we expect from one who would study medicine?

Women do not like to be laughed at and called strong-minded. They would rather suffer pain and discomfort in body than be wounded in heart by those whom they love. This seems a plight — certainly we are warranted in using the word, for never was mortal more plicated, enfolded, almost inextricably entangled — this seems a plight in which you, my brothers, have a work to accomplish, which no one else can do.

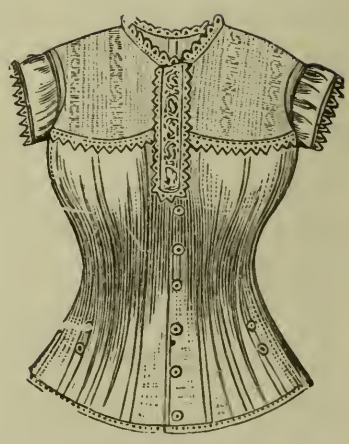
Will you do it?

Dr. Betts remarked that several women among the laity had done very valuable service to woman, by devising and putting into the market underwear which fulfilled, in a great degree, the indication for removing pressure and weight from the waist and abdomen. By these garments the clothing is evenly distributed over the body, circulation is not interfered with, and warmth to the extremities is secured. Among these garments are the Bates, the Flynt, also the Equipoise, specimens of which were placed upon the table and examined with great interest by the members of the Society.

THE BATES COMBINATION SUIT.



THE FLINT WAIST AND GARMENTS.



BATES WAIST.

THE TREATMENT OF CICATRICES IN THE COLLUM UTERI AND IN THE ROOF OF THE VAGINA.

BY A. MARTIN, M.D.,

OF BERLIN, GERMANY.

Read December 10, 1885.

When, as long ago as 1862, and then more fully in 1874, Emmet indicated the operative treatment of rents in the cervix, which he considered as the sources of a whole series of gynecological maladies, these conditions had up to this time, been very little observed. They had been recognized as the cause of a relatively infrequent eversion (E. Martin) or of an ectropium (Roser).

Emmet, on the other hand, regarded these rents as the sources of catarrhs of the cervix and of the *corpus uteri.* He emphasized the difficulty and even occasional impossibility of healing these catarrhs as long as the rent exists. He further pointed out that these scars are the source of long-continuing, ever-spreading irritation in the pelvis. Finally, he very particularly insisted that such rents hinder the proper development of the uterus, if it become pregnant, and that in consequence, in a great number of cases, abortion is occasioned by them, and that many women who habitually abort suffer from rents in the cervix. His proposition to heal these by operation, to perform trachelorraphy, excited very extraordinary notice at that time; since it occurred just when far more attention was being given to securing a widely-gaping aperture of the uterus, and the influence of the bilateral discission was supreme.

Emmet's propositions made progress among the Americans very rapidly, considering all things. In Europe, how-

ever, it was quite the contrary, and this operation was received very doubtfully, especially in Germany, although at that time operative gynécology was in a state of active development. First, there was opposed to the method of Emmet the general disinclination in Germany to favor operative interference with the *portio vaginalis.* Then the attempts which were made to perform trachelorraphy were not seldom followed by imperfect results; the old cicatricial formation soon showed itself again more or less, or, on the other hand, there was formed a stenosis,—an evil which just at that time it seemed to be a duty to zealously overcome by discissions.

But even when, in Germany, the plastic operations on the *portio vaginalis* in great numbers were well received, and authors like Breisky, Spiegelberg, and Schroder, and among others the writer, busied themselves with this operation, the operation of Emmet remained a rarity. Although, perhaps not least by the recommendation of amputation of the *portio vaginalis*, which I warmly advised in 1878, at the meeting of German Physicians and Naturalists in Cassel, as imperatively indicated for wider fields of usefulness, gynecology was led so far that excision and amputation of the lips of the *os uteri* were undertaken, not solely on account of chronic metritis and malignant degeneration, and in Germany this operation became very frequent; yet notwithstanding all this, strangely enough Emmet's operation did not come into the class of the frequent gynecological procedures. This seems somewhat strange to American authors, especially if, after a prolonged sojourn in Germany, they observe our daily work; and this impression is fully expressed in the late work by Bigelow ("Berlin a Medical Centre").

The cause of this peculiar state of things, however, is not at all that we do not recognize the importance of the cicatrices, that we regard the removal of the latter as anything difficult, or that the permanent results of our operative interference on the cervix were unsatisfactory; but the

question was first considered whether the cervical rents are really the essential cause of the troubles on which Emmet insisted. The answer to this question is that we see cervical rents causing no symptoms too often to permit us to reply affirmatively. There are either, (1) *Catarrhal complications*, i. e., *affections of the mucous membrane;* or (2) *Peculiar and rare cicatricial formations*, which give importance to the cervical rents, and in such cases these should be attacked.

There is not the least doubt that we frequently find *catarrhs as complications of cervical rents.* But in such cases the catarrh is not dependent on the rent as such. It has either originated as an independent disease simultaneously with the injury of the cervix, or it has occurred there later. Doubtless, then, the symptoms of catarrh are much more prominent. The development of the glands of the area affected, and the increase in volume connected therewith, cause a protrusion of the diseased mucous membrane; the torn *os uteri* gapes, the cervical mucous membrane protrudes swollen, and with its hypersecretion and its hæmorrhages shows the well-known and very typical appearance. The glandular new formation, which we must recognize as the anatomical foundation of the erosions, according to C. Ruge's very significant investigations, also keeps spreading on the surface of the rent of the cicatricial tissue here developed, as it may also cover the whole surface of the *portio vaginalis.* Undoubtedly these complications resist obstinately any therapeutic measures. This form of catarrh can be healed only by careful treatment, so that such patients must frequently suffer very severely, and become chronic invalids.

Emmet prefers to cure this affection of the mucous membrane by patient local treatment, and then performing trachelorraphy. In Germany it is generally preferred, as it appears, to use a more energetic treatment of the affection of the mucous membrane, after some trial of what treatment

with medicaments for a reasonable period can accomplish. In such a case, however, there is no object in making also a trachelorraphy as such. For it is better to combine the excision of the mucous membrane with that of the cervical cicatrices; amputate the vaginal portion. By this means, as a rule, a very well.shaped new *portio* will be formed in place of the torn, everted, diseased one. The majority of cases of amputation, according to the method of Hegar or Schroder, or as I do it as a rule, according to a plan combining both of these (see A. Martin's Pathology, Treatment and Diseases of Women, 1885, p. 285), gives a stump where, after completion of involution, very frequently the previous operation can be as little discovered as the alteration which led to the operation. But in a few cases which heal thus typically there is moreover a proper aperture of the orifice with the lips of the *os uteri*, and a covering of flat epithelium. I have repeatedly endeavored to combine the typical Emmet's operation with excision of the diseased mucous membrane, and Schroder has also attempted this. For my part, however, I have given up this method completely, and in these cases I practise simply the typical amputation.

The cicatricial formation of rents in the cervix goes on and terminates in very different ways. It may so heal, corresponding to the quick changes in the cervical tissues, that scarcely any hardness and scarcely any cicatricial tissue can be distinguished, either by palpation or by the microscope. In other cases the cicatricial ramifications extend far beyond the immediate vicinity of the rent. Thence arises a displacement by contraction of the cervix, and also of the body of the uterus, which may disturb the physiological position and shape of these parts of the uterus in connection with respiration and motion; and fulness of the adjacent organs in connection with their changes during menstruation and pregnancy.

Severe consequences occur when the rent has extended into the *parametrium*, reaching the base of broad ligament

and the roof of the vagina, and drawing them out of shape, and, in a unilateral affection, drawing the uterus as far as the wall of the pelvis, or in cases of bilateral cicatricial formation, fixes it in the middle of the floor of the pelvis. Such fixation shows its presence at every jar of the body, at every change of position of the uterus. On this account severe distress is occasioned in almost all stages of the development of the malady, frequently defying treatment by medicaments. Operative interference is called for in these cases, and with such indications we practise it with the best results.

Cicatricial formation limited to the cervix is commonly treated by us by the typical trachelorraphy of Emmet. The results of this operation correspond to the good success which Emmet himself reports from it. When the mucous membrane is healthy a good scar is formed, which in case of subsequent pregnancy neither shows itself as a hinderance to the development of the body of the uterus or cervix, nor during delivery is found to be a weak spot, easily torn in the external os.

In cases of extension of the cicatrices in the roof of the vagina I am accustomed to use a somewhat different procedure. I first separate the cicatricial tissue of the roof of the vagina and of the floor of the pelvis from the cervix uteri, and excise the former completely from its environment. Then, if the cervical mucous membrane be healthy, I refresh the scar in the cervix, and here also I remove thoroughly all cicatricial tissue. Then the sutures are put in in such a way that the wound, which was first round, or even gaping parallel to the median line of the floor of the pelvis, is united to form a scar running transversely through the roof of the vagina. This scar running transversely through the roof of the vagina terminates in the end of the cervical rent; the latter is closed either according to Emmet's plan, or, if there be at the same time disease of the mucous membrane, an amputation of the lips, excision of the erosions,

and curetting of the mucous membrane of the uterine body is performed. The dissection of the cicatrix from the cervix is made with a pointed two-edged knife, and seems easy to perform when the parts are put properly on the stretch with the patient on her back and the vagina held well open by a Simon's speculum and Hegar's holders (see A. Martin's "Diseases of Women," p. 24, fig. 15). The wound gapes, often large arteries spurt (branches of the uterine artery), and require quick action in controlling the hæmorrhage; or, on the other hand, temporary ligation at the sides. The womb falls away from the wound by its own weight towards the median line in cases in which it has been distorted towards the side.

After sewing up the wound a normal configuration of the roof of the vagina is generally attained. Convalescence in the cases observed by me was attended by no difficulties. The final result, however, was surprising in the completeness of the removal of the severe symptoms which had accompanied these cicatricial contractions. One of my former assistants, Dr. Czempin, has undertaken the presentation of the detailed histories of the cases observed by me, so that I can refer to this work, which will soon appear, concerning the various particulars of the cases.

DISCUSSION.

Dr. Warner did not fully agree with the sentiments so ably set forth in Dr. Martin's paper. He felt that the tendency of modern gynecologists is to exclude all treatment except operative measures. At least, many surgeons seemed to neglect all constitutional and mild local treatment in favor of the knife, ignoring and having no faith in drugs. If this tendency becomes general, the physician who is not a surgeon will have little to do except to be a looker-on in the practice of gynecology, while in reality more can be done with drugs in the way of local and constitutional treatment than can be accomplished with the knife. He asked the gentlemen present what had been their experience in regard

to the operation for repairing rents and cicatrices of the cervix, as far as concerned relief of symptoms previously complained of? As far as he knew, but few had been relieved by operation, as practised here, of any of the symptoms of which they suffered. Agreeing with Dr. Martin that the rent was not of importance, nor yet the cicatrix without a diseased condition of the cervical mucous membrane, he insisted that such diseased condition, with the accompanying erosion and eversion of the cervical lips, is caused by an irritating discharge coming from the cavity of the body of the uterus. Unless the disease of the fundus is cured, and the discharge stopped, it will do no real good to sew up the cervix. If the disease of the fundus with its acrid secretion is cured, however, the repair of the cervix is unnecessary, as the erosions can be healed, the eversion diminishes, and the patient gets practically well. Dr. Warner recognizes the wisdom of Dr. Martin in attacking the disease of the fundus by a thorough curetting at the time of the operation, which, for as skilful an operator as Dr. Martin, and in his own well-appointed hospital, is doubtless a good treatment. If Dr. Martin, however, rested at the curetting without repairing or amputating the cervix, he would find that the patient could be healed without further operation. Dr. Warner insisted that hereabouts, however, many gynecologists practised operations for repairing the cervix without attacking the disease of the body, and that, perhaps from lack of skill and advantages of Dr. Martin, he had known of many bad cases of cellulitis, etc., caused by the operation without cure of the disease. He playfully likened such incomplete treatment to excision of a section of the eroded upper lip in boys who do not keep their noses clean, and thought the latter operation not countenanced by surgeons.

In answer to a question as to the proper treatment, Dr. Warner said that for curing the endometritis he was not able, in a few minutes, to give rules covering all cases, as it was, above all, essential to consider the circumstances of each case; in a general way, he relied largely on a proper regulation of the functions of the intestines and liver, and locally in the judicious use of iodine, acid carbolic, or even, in some cases, of acid nitrate of mercury. As for erosions and eversions, the latter are usually kept up by cysts in or under the surface, sometimes pretty deep; these must be punctured, and then the erosions heal easily under stimulating or some-

times escharotic applications, swelling disappears, and the patient gets well, provided the endometritis has been cured, and not otherwise. For the acrid discharge from the fundus is strong enough to cause not only erosions of the cervix, but also of the vagina, and, in bad cases, of the labia, thighs, and abdomen. Removing this cause, the effects are easily cured.

Dr. E. W. Cushing defended the views which Dr. Martin had set forth in his paper in regard to the pathology of these cases. He asserted that there was no real erosion of the epithelium in those cases where the epithelium seemed to be absent, but that the gland tissue of the cervix, which is normally limited to the mucous membrane or its immediately subjacent layers, increases to such an extent as to invade the other tissues. This process sometimes goes on to such an extent as to lead to glandular degeneration of the entire thickness of the cervix. In such cases he maintained that Dr. Martin's operation was the only one which promised success,— showing the hopelessness of the ordinary stimulating treatment often employed. Dr. Cushing exhibited several sections which, under the microscope, illustrated the pathology of these cases; he also showed sections of the pieces which Dr. Martin had removed from the lips of the cervix. He also showed the instruments with which Dr. Martin operates, and, by reference to the text-book of the latter, which he brought with him, and by figures on the board, explained the details of position, etc., and the manner of employing antiseptics and enforcing surgical cleanliness, which enable Dr. Martin to get such results. Dr. Cushing also referred to the danger that the glands, which grew with such rapidity, invading tissues where they do not belong, may in chronic cases begin to increase at such a rate as to be really malignant growths.

Dr. W. S. Brown thought the paper a valuable one, but feared that too much emphasis was put upon the *surgical* treatment of these cases. He did not agree with those doctors who do so much surgery. In his hands the majority of these cases yield to milder measures, such as thoroughly scraping the affected parts by means of the dull or sharp curette. This method of treatment had yielded better results than local applications of carbolic acid or iodine. In some cases, however, excision is the only efficient treatment. When minute cysts are present in the cervix they must be punct-

ured. Proper constitutional treatment is of great importance, and should never be overlooked.

Dr. Marcy said that twenty years ago, in the Rotunda Hospital, at Dublin, the routine treatment of these cases consisted of applications of nitrate of silver in strength varying from 20–40 grs. per ℥i. This treatment of these lesions by local applications was slow and painful, and the profession has drifted into the surgical treatment of these cases.

THE OBSTETRIC FORCEPS.

BY SAMUEL N. NELSON, A.M., M.D.,

OF BOSTON, MASS.

Read September 13, 1883.

OBJECT AND INDICATIONS.

THE object of the obstetric forceps is to aid the delivery of women, where the head of the fœtus presents, and for the expulsion of which the natural powers are for some reason insufficient.

The indications for the use of the forceps are excellently formulated by Dr. A. R. Simpson, of Edinburgh, as follows:

They arise either in delayed labors, or in labors immediately dangerous.

A. Delayed labors, in which the fault may be

a. In the parturient powers, *i. e.*

1. The uterine power, due to
   - X. Atony or inertia.
   - Y. Irregular action of the uterus.
   - Z. Misdirection of power.
2. The abdominal power.

b. Or in the parturient passages, *i. e.*

1. The soft canals.
   - X. The cervix.
   - Y. The vaginal walls.
   - Z. The perineum.
2. When in the hard canals, the degree of contraction that requires and permits the application of the forceps ranges from a line less than four inches to three and a quarter inches, in the conjugate diameter of the brim.

c. Or in the passenger, due to
1. Large size of the head.
2. Malposition of the head.
3. Malpresentation of the head.

B. Labors immediately dangerous, due to
a. Maternal complications.
b. Fœtal complications.

The mode of action of the obstetric forceps may be formulated as follows: —

1. The great and primary use is as a tractor, and it is used with the greatest advantage when it is employed merely to supplement the action of the uterus, which is insufficient of itself to effect delivery; or when, from some complication, it is necessary to complete labor with greater rapidity than can be accomplished by the unaided powers of nature. For this, traction is generally sufficient; but

2. With ordinary forceps no traction can be made without some compression. This, however, should be made as little as possible; for, as the compression increases, what is gained in one direction is lost in the other, and much compression would endanger the life of the child.

3. The head tends to undergo the usual movements of rotation, if the operator is simply careful not to hinder it; and cases may arise when it may be promoted by judicious management with the forceps.

4. The forceps also possess a dynamic power; that is, by their presence as a foreign body the parturient powers are revived.

LEVER MOVEMENT.

5. When the head is not descending under straight forward traction, most writers recommend an alternate lateral lever movement called the pendulum lever movement, which has been so strongly denounced in a paper read before the American Gynecological Society, in 1878, by Dr. Albert H. Smith, of Philadelphia, that I wish to give it brief attention.

Here, as he says, he places himself in antagonism with the highest obstetric authorities, except Dr. Matthews Duncan and the Vienna school; but he is, moreover, very positive of the correctness of his views.

Supposing the head engaged in the pelvis and the forceps applied, he asks: "What now will be the effect of traction by the various methods suggested?" He goes on to reply: If, firstly, the handles of the forceps be drawn upon directly, without any compression or lateral movement, the blades will slide forward upon the head until they reach a position where the points come in contact with the convex surface of the farther extremity of the head. If then there be much head curvature of the blades, they will separate until the convex surfaces are so firmly compressed against the pelvic walls that farther separation is prevented, and the force of traction will be then expended upon the farther extremity of the head by means of the points and the concave surface of the blades near the point. The head descends by propulsion from a *vis a tergo* from two sources, — the uterine contraction and the points of the forceps blades.

If, on the other hand, we have a swinging movement without traction or compression, then the blades of the forceps will glide up and down between the head and the pelvic walls, in no degree whatever changing the position of the head. If, further, we have traction and oscillation combined without compression, then we have simply the double effect of the two, neither one aiding or interfering with the other.

Now, let us suppose the head compressed sufficiently to make the head and the forceps practically a continuous bar, and let simple traction in the median line be made, the handles not changing their direction; then the maximum diameter maintains its correspondence with the axis of the pelvis, and the plane of the transverse diameter moves steadily forward, preserving its relation with the pelvic planes.

Let us now see what will be the effect of pure oscillation or leverage, as it is called, with compression but without

traction,— the method recommended by Dr. Barnes. This simply brings to press upon the pelvic walls, with a sort of slow vibratory impaction, portions of the head farther separated from each other than the points which rested in contact with those walls before the swaying motion was started; and, while the pelvic canal is subject to alternations of excessive pressure and partial relief, there is nothing in the movement itself to advance the head an iota, the side which descends with the sway of the handles in one direction, ascending equally (unless driven down by the *vis a tergo*, which acts altogether independently of it), when the handles are swayed in the opposite direction.

Lastly, we have the oscillations combined with traction and compression. As the transverse diameter is less than an oblique line drawn from any point to the opposite circumference, this motion must cause to press upon the opposite surfaces of the pelvis the extremities of a diameter longer than the transverse diameter. Here then leverage, without traction, is simply traction plus an aggregation of pressure upon surfaces, already so tightly compressed by the circumference of the child's head as to obstruct its advance towards the outlet of the pelvis. When Dr. Bedford tells us to exert our traction two-thirds laterally and one-third direct, he practically tells us to expend one-third of our force in drawing the head in the direction we wish it to advance, and two-thirds in dragging it against the walls of the pelvis, through which it cannot go; or we might put it in reference to the ethical bearing of the operation, to expend one-third of our force in aiding nature in the expulsion of the child, and two-thirds in trampling upon the laws of nature by the wanton bruising of the child's head against the tender and, perhaps, already mutilated tissues lining the pelvic cavity.

It is only fair to add that, in the discussion which followed Dr. Smith's paper, his views were opposed by Dr. White of Buffalo, Dr. Penrose of Philadelphia, and Dr. Barker and Dr. Thomas of New York; while Dr. Storer of

Boston and Dr. Goodell of Philadelphia agreed with him.

PARTURIENT CANAL.

It is worth while to give a brief consideration to the parturient canal, through which the head of the fœtus must pass in its expulsion. The movement of the fœtal head is influenced by the dimensions of the canal, by the direction of its curvature, and by the eminences and intervening spaces of its walls. The upper part of the true pelvis forms a continuous osseous ring. In its lowest part are three triangular walls, viz. : a part of the sacrum with the os coccyx, and the two ischii terminating in the ischiatic tuberosities. Between the walls are formed arched intervals, of which the two posterior are filled with elastic soft parts and the anterior is vacuous. This aperture is bounded posteriorly by the perineal body, an elastic wall completely dilatable to the limits formed by the coccyx and ischiatic tuberosities, and by this wall force acting in a forward direction is exerted. The posterior wall of the true pelvis has its origin above in an angular promontory from which inclined planes descend posteriorly and laterally. The plane which descends posteriorly terminates in the middle of the third sacral vertebra, from which runs another plane inclined downwards and forwards. By this change of direction in the posterior wall of the pelvic canal is determined the forward movement of the fœtal head.

The planes of the pelvic canal are planes drawn perpendicular to any portion of its circumference. The axis of the entire pelvic canal is represented by the sum of the axes of the indefinite number of planes thus formed, and makes an irregular parabolic line.

The outlet of the bony female pelvis is filled in by what is generally described as the "soft parts;" but this term is misleading, and it is better named the pelvic floor or pelvic diaphragm.

The formation of the parturient canal in the floor of the pelvis is described in a novel manner by Dr. D. Berry Hart, in his Manual of Gynæcology, published in 1882. Dr. Hart says: "The first idea one gets on looking at such a section is that, owing to the apposition of the vaginal walls, the pelvic floor in the woman is unbroken. It is made up of two segments, which are known as the pubic and sacral segments. The pubic segment is made up of loose tissue, viz., bladder, urethra, anterior vaginal wall, and bladder peritoneum. It is attached in front to the symphysis pubis, and this attachment is a loose one. The sacral segment is attached to the coccyx and sacrum: it consists of rectum, perineum, and strong tendinous and muscular tissue. The pubic segment is also attached on each side to the anterior bony pelvic wall, while the sacral segment is attached in like manner to the posterior bony pelvic wall. Finally, these two segments blend with each other on the right and left sides of the vagina.

"The pubic segment is made up of loose tissue, and is loosely attached to the pubic symphysis; the sacral segment is made up of strong tissue, and is firmly dovetailed into the sacrum and coccyx. Moreover, the pubic segment is drawn up during labor, and the sacral segment is driven down. They act like folding-doors. Uterine action pulls up the pubic segment and drives the child down against the sacral one. This action is analogous to the way one passes through folding-doors, where he pulls one door toward him and pushes the other from him."

PERINEAL BODY.

The perineal body is of much importance to the obstetrician. It is made up of muscular insertions and origins, and fibrous and elastic tissue. Its anterior surface is behind the posterior vaginal wall; and the posterior surface lies in front of the anterior rectal wall and anus; while laterally it is bounded by fat. The perineal body measures about one

and-a-half inches vertically, the same transversely, and three-fourths of an inch antero-posteriorly. Its functions are important, but have been both exaggerated and underrated. It gives a fixed point for many muscles, prevents pouching of the rectum forward, and strengthens that part of the pelvic floor which has no posterior bony support.

When the fœtal head is passing through the vaginal orifice, it distends it all around; while, when passing through the vulvar orifice, it distends the lower half of this only, *i. e.*, it does not stretch those parts of the vulva lying above the level of the meatus urinarius. As the result of normal and abnormal child-birth, we get certain tears of the inferior end of the perineum. Extensive tear of this during labor means not only a larger raw surface for septic absorption, but also is one factor predisposing to prolapsus uteri.

The perineum may tear from over-distention of the orifice, or from the too forcible driving of the fœtal head against it. The down-coming shoulder, too, may cause a rupture.

HISTORY OF THE FORCEPS.

Nearly all writers give the credit of the invention of the forceps to the Chamberlens, some time previous to 1647.

Churchill, in his text-book on the Theory and Practice of Midwifery, quoting a Latin translation from Avicenna, thinks he traces in it evidence that the forceps were known to the early Arabians, and most writers since the publication of his book have quoted his views. This, however, has been doubted by more recent and thorough investigators.

Dr. J. R. Quinan, of Baltimore, says:* "We have only to consult the dusty tomes of Celsus, Paulus Æginet, Avicenna, etc., all of whom treat more or less largely of the means and the modes of extracting a dead fœtus, but none of delivering it alive."

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*The Maryland Medical Journal, Baltimore, 1881-1882. VIII. pp. 292, 297.

Dr. David Hunt, of Boston, also, after a careful study of the passage quoted by Churchill from Avicenna, together with others from the same author, says in a paper read before the Suffolk District Medical Society, Feb. 24, 1877: "It seems to me that this is sufficient to do away with the idea that Avicenna, the ruler of medical thought for 600 years, the teacher of so many of the teachers of Europe, that such a well-known authority could have used and described our obstetric forceps, and the knowledge of them could have been lost."

Aside from a suggestion by Rueff, in 1554, of a forceps which was not practicable, because it had a fixed joint which necessarily interfered with its introduction and application to the fœtal head, we hear of no one who succeeded in devising an instrument capable of delivering a living child, until the Chamberlens invented the fenestrated and adjustable forceps, which they kept a family secret for upwards of seventy-five years.

Churchill and others following him give the credit of the invention to Dr. Paul Chamberlen, and mention his sons, Peter and Hugh, as also possessors of the secret. Dr. J. H. Aveling, however, has published an exhaustive work (reviewed in the American Journal of the Medical Sciences, April, 1883, p. 483,) in which* he has unravelled the mystery of the Chamberlen family, after many years of earnest search, and he says that the result of his investigations shows that the accounts previously published by himself as well as others are untrustworthy and incorrect. The secret was in possession of the family for four generations, and in the hands of seven "men-midwives." These are the descendants of William Chamberlen, a Huguenot, who left Paris in 1569, to escape persecution under Charles IX. At this time his son Peter, the elder, was a little boy. He was

* "The Chamberlens and the Midwifery Forceps, Memorials of the Family, and an Essay on the Invention of the Instrument," by J. H. Aveling, M.D., F.S.A., 8vo. London: J. & A. Churchill, 1882.

born in Paris about 1560, and is the one referred to by Smellie as the uncle of the celebrated Peter Chamberlen, and the inventor of the forceps.

A younger son, also called Peter, was born in England, in 1572. He became a barber surgeon and a man-midwife, and used the forceps. His son Peter, who may be called Peter III., to distinguish him from his father and uncle, is the Peter Chamberlen mentioned by Churchill and others. In 1647, he published the pamphlet entitled "A Voice in Rhama," in which he makes the first known mention of the use of the forceps.

Hugh Chamberlen was the son of Peter III. He went to Paris in 1670, with the intention of selling their secret mode of delivery. Here he attempted to deliver a woman with deformed pelvis, promising to do it in "half a quarter of an hour;" but after laboring more than three hours he abandoned the case. The woman died in twenty-four hours, and an autopsy showed that the uterus was torn and pierced in several places by his instruments. Disgusted with his defeat, he returned in a few days to London, taking with him a copy of Mauriceau's Midwifery, which he translated and published in 1672, and the preface of which he evidently designed as an advertisement of his special ability to deliver without hooks, so as to preserve fœtal life in difficult cases.

For several years his attention was then given to a project for establishing a Land Bank, — a wild scheme for issuing a superabundant paper currency upon a fractional basis of security; but this collapsed, and he left the country. Dr. Aveling says: "He practised his profession for some years in Amsterdam, sold his secret to Roonhuysen, who sold it again to others, and thus it gradually became known in Holland among those who were willing to pay for the information." Although it is generally stated that Hugh Chamberlen sold his secret to Roonhuysen in 1688, Dr. Aveling thinks he was in England at this time, and for a long time afterward, fully engrossed with practice, and advo-

cating the formation of his Land Bank. He went to Holland some time about 1700. Where he died and when have not been ascertained.

Two other sons of Peter III., Paul and John Chamberlen, also practised midwifery in England at this time. The seventh and last of the Chamberlens to enjoy the exclusive use of the family secret was Hugh, the son of Hugh above mentioned.

The secret, however, became known in some way to two or three others. Dr. Aveling says: "*The first publication in England which gave pictures of the forceps* was the posthumous work of Mr. William Giffard, surgeon and man-midwife of London, published in 1734." Mr. Edmund Chapman, however, is generally credited with bringing it into public notice; for, in his book published in 1733, he speaks of having used the forceps for many years; but he gave no illustration of his instrument till the second edition of his book in 1735, a year after Giffard's work appeared. Dr. R. W. Johnson mentions in his Midwifery, published in 1769, that Dr. Drinkwater, who commenced practice in 1668, and who died in 1728, left a pair of forceps with him.

In 1813, nearly a century after the death of the last Hugh, there was discovered in the house formerly occupied by Dr. Peter Chamberlen, a secret closet, in which, among other articles of the Chamberlens, were found their obstetric instruments, consisting of four pairs of forceps of different patterns, three vectes, three crotchets, and three fillets formed chiefly of whalebone. Of these forceps, one pair was so rudely constructed as to be impracticable. The blades were united by a rivet which could be unscrewed. Two others were united by cords passed through a hole in the lock; and the fourth had a rivet in one half fitting loosely in a hole in the other half.

Churchill says: "The credit of first introducing the instrument into French practice is due to Palfyn. One of the first persons who used it was M. Duré."

The earliest German practitioner who made use of the

forceps appears to have been Cornelius Von Solingen, in 1673.

From this time there have been countless modifications of the forceps, varying in minutiæ of detail, but necessarily remaining in principle the same; for the forceps is an instrument to lengthen the hands of the operator, as it were, so that he may grasp the fœtal head while in the pelvic canal, and thus, applying power from below, aid its delivery. This power is called by some writers *vis a fronte*, and by others *vis a tergo*, but they look upon it in different ways. The power is of course in front, but it acts on the back part of the child's head.

HANDLES.

The handles of the typical French forceps end in hooks curving outward, through which traction is effected. German obstetricians place their traction hooks nearer, sometimes close to the locks. Until Simpson borrowed the Nægele hooks, British obstetricians obtained traction power by grasping the handle in all its length, sometimes supplementing it by passing a finger between the shanks of the blades. Later obstetricians apply additional handles for traction.

LOCKS.

The lock most in use is the Smellie lock, as seen on the Simpson forceps. Next in favor is the thumbscrew used on the Hodge forceps. This, I think, is called the Siebold lock.

FENESTRÆ AND CRANIAL CURVE

The blades of the forceps have fenestræ, which no tonly make them lighter but provide for more accurate adjustment to the fœtal head.

The cranial curve of the forceps is an essential feature, and, though varying in construction, is found on all alike. It is indispensable, because only by means of it, and the

approximation of the tips of the blades, can the head be grasped.

CLASSIFICATION.

Long and short forceps, differing only in the matter of length, may well be classed together. The most practical classification, as it seems to me, is as follows: —

A. The straight forceps.
B. The forceps with pelvic curve.
C. The axis-traction forceps.

STRAIGHT FORCEPS.

Most writers who prefer the straight forceps merely mention the fact and give no reasons therefor.

Prof. Lazarewitsch, however, says: "The pelvic curve in the blades of the forceps is not only useless, but it may also cause injuries by rendering it difficult to ascertain the direction of the acting power, and by not allowing the action on the head with such certainty of the correctness of movement communicated to it as is accessible in the employment of straight forceps." He thinks, on application of the straight forceps when the head is high, that the perineum is not so violently pressed backwards as on employing forceps with the pelvic curve, and that the straight forceps acting in a direct line does not in its movement press with its anterior and posterior margins on the parturient canal, as must be done with forceps having the pelvic curve.

PELVIC CURVE.

The advantages of the pelvic curve are set forth by Dr. Playfair in these words: "The forceps we are now considering (the straight forceps) and the many modifications formed on the same plan, is constructed solely with reference to the child's head, and without regard to the axes of

the maternal passages. Consequently, were we to introduce it when the head was at the upper part of the pelvis we could not fail to expose the soft parts of the mother to the risk of contusion, and (in consequence of drawing more directly backwards) unduly stretch and even lacerate the perineum. Hence it is admitted by obstetricians, with few exceptions, that the second curve is essential before the complete descent of the head, although it is not absolutely so after this has taken place."

AXIS-TRACTION.

Those who claim special advantages for the axis-traction forceps are well represented by Dr. A. R. Simpson, who stated his views in a communication to the Obstetrical Society of Edinburgh, July 21, 1880. Concerning the double curved forceps he said: "Let us suppose any of them applied to the head at the brim of the pelvis, and let us ask in what direction the traction is applied, and what will be its effect. Let us suppose, for example, the traction applied through the hooks at the extremities of the handles, as in the French instrument. If we study this it is seen that the central point of the head ought to travel downwards in the direction of the line along which it would be driven by natural powers. But traction applied simply through the hooks will act in the direction of the line running parallel to the handles. Only a part of the power thus applied will be available for dragging the head in the axis of the brim. If we resolve the force into its components we find that — of these the useful component, in a case where a force of the weight of 50 pounds meets the line of descent at an angle of 40°, would be only 38½ lbs. And it is important to observe that while a force of only 38½ lbs. is acting in a useful direction, a force of 12 lbs. is being exerted in a vicious direction, crushing the head against the symphysis. As the actual line of traction diverges from the axial one, the

amount of detrimental pressure very rapidly increases. If the pull be directly in the axis, the force would be all available, and there would be no detrimental pressure on the wall of the passages." Concerning the Tarnier forceps, Dr. Simpson says: "By far the most valuable suggestion for obtaining the full benefit of forceps with a pelvic curve is that made in 1877 by M. Tarnier." Yet he is not quite satisfied with this instrument, and has applied traction rods to the ordinary Simpson forceps, with better result, as he claims. After describing the instrument at length, he adds: "The advantages claimed for such axis-traction forceps as I have described are as follows: —

"1. All the force expended by the operator is useful. He expends no energy in compressing or keeping the handles together while he pulls, and none of the pulling power is lost.

"2. There is no unnecessary and injurious pressure produced on the maternal structures. The head is made to advance under the pull of this *vis a fronte* in the same direction as it would move under the impulse of the natural *vis a tergo.*

"3. The head not being dragged against the symphysis pubis, it is not so likely to elude their grasp.

"4. The transverse traction handle gives a solid grasp and purchase for pulling.

* * * * * * * * * *

"9. There is no impairment of the muscular sense, any more than of the muscular power. The operator is therefore better able to judge of the amount of force expended, and to recognize when the distention of the perineum is becoming dangerous."

The simplest mechanism by far, by which this result is obtained, was made by Dr. W. H. Grainger, of Boston, and consists of a small handle, detachable at will, applied to the ordinary Elliot forceps above the lock.

The use of the obstetric forceps, like any other surgical operation, should be attended with antiseptic precautions. There should be at hand a bowl containing a solution of bichloride of mercury, 1 to 1,000, or carbolic acid, 1 to 40, with which the vagina should be wiped out, and the hands of the operator and the instruments should be cleansed before using. Better results are secured thereby, and the napkins applied to the parts for several days should be sprinkled with such a solution.

As the science of midwifery has advanced, the use of the forceps has become of more frequent occurrence. In unskilful hands it is an instrument capable of much harm; but every obstetrician should become thoroughly familiar with its use, and, in suitable cases, he will find it an invaluable aid in saving, not only time for himself, but also suffering for the mother, and not unfrequently the life of the child.

DISCUSSION.

Dr. H. A. Martin said that he was much interested in the subject, although he had had nothing to do with obstetrics in recent years. The older forceps had teeth, and were doubtless intended to extract the dead fœtus only.

When in midwifery practice, he had been accustomed to use the forceps in about two-thirds of all his cases. For ordinary occasions, the best form is the straight forceps. Most of the instruments displayed on the table are only of value to advertise the man who invented them.

No man has any right to apply the long forceps above the brim of the pelvis without a consultation. Any man can apply; but to draw down, with proper regard to the safety of mother and child, is an entirely different affair.

Dr. H. O. Marcy would enforce Dr. Martin's suggestion with respect to the careful adaptation of the forceps to the head of the fœtus. It was not always easy to make out the presentation. In his own experience he had, at times, found it necessary to sweep the entire hand around the head before he could determine its

exact relations; and such determination should always be reached before the forceps were applied. Dr. Marcy objected to Prof. Simpson's method with the so-called to-and-fro movement. We often see injury to the soft parts from this vicious method.

Dr. A. P. Clarke did not concur in such sweeping strictures against the leverage movement. In one of his cases, in which Dr. Wellington was called in to assist, no other method could have brought the child into the world. It is true that this measure is only exceptionally necessary.

As respects old-fashioned forceps, Dr. Ramsbotham refers to a pair brought to his father, by a friend, from Paris, which weighed two pounds five ounces and three-quarters; and the extremities of the points are in perfect contact when the handles are closed. Dr. Clarke showed the Society a similar pair, which, although heavy and clumsy, were capable of safely helping a live child out of duress.

Dr. W. S. Brown did not believe that the straight forceps were always the best. They can only be applied advantageously when the head lies down in the pelvis. As to the to-and-fro movement, he differed from the reader, and was sure that certain conditions both justify and demand resort to it. Its mode of operation was illustrated by the corresponding effort to withdraw a tightly-wedged cork from a bottle, and also by the method familiar to gentlemen of drawing down close-fitting pantaloons,—not by direct traction, but first one side and then the other.

Dr. Martin was astonished at the position which Dr. Marcy had taken upon this question. Some writers speak of the vast amount of force required to bring a child into the world. Such a confession is evidence either that the forceps were not skilfully used, or that they should not have been used at all.

Dr. Nelson was familiar with the illustration drawn from the cork in the bottle; but Dr. A. H. Smith had recently shown the fallacy of this argument. So also with the nail in the board; here the confessed purpose, or at least the obvious result, of the leverage movement was to make more room for the nail, at the cost of the soft parts, *i. e.*, of the wood.

Dr. Martin asked, How is it with the application of the same principle in tooth-pulling? The truth is, in the proper application of the leverage movement in obstetrics, the passage holds the head

to all we gain,— now on one side, and again on the other. The worst consequences to the soft parts of the mother he had ever witnessed came from direct traction, and the effort to draw in a straight line from umbilicus to rectum.

GYNECIC AND OBSTETRIC USES OF CHLORAL HYDRATE.

BY MARSHALL L. BROWN, M.D.,

OF ALLSTON, MASS.

Read April 7, 1881.

"Chloral Hydrate produces muscular relaxation, which relaxation extends to the muscles of volition, and alike to the iris and the muscular arterial system. Its action on the nervous system is primarily on the sympathetic ganglia, afterwards on the cerebrum, and finally on the heart."—*Dr. B. W. Richardson, in Medical Times and Gazette*, 1869.

In the medical literature of the past dozen years may be found much relative to the therapeutical action of this valuable remedial agent. But in looking through this mass of medical literature, or as much as has to me been available, I have found that almost invariably it is spoken of as an anesthetic, or as a hypnotic, and sometimes as a sedative to the nervous system.

I wish particularly to call your attention to the fact that Chloral Hydrate is the agent which will antagonize and control all irregular, excessive, or abnormal muscular contraction, whether it be the spasmodic action of the uterine muscular fibres, as in some cases of dysmenorrhea, in uterine colic, in excessively painful and powerful contractions due to reflex irritation, or that general tonic spasm of the entire muscular system — that sphynx of medicine, so called, — traumatic tetanus — all alike may be and are controlled when the doses of Chloral Hydrate are commensurate to the case in hand. What I wish to state in brief is, that Chloral Hydrate is opposed to and will control *all* spasmodic muscular action; that it may be given to the extent of overcoming the severest spasm. It is by virtue of this property that it is so often the best

remedy to use in cases requiring an antispasmodic remedial agent. In all cases where there is pain due to the *unusual*, *excessive*, or *spasmodic* action of the muscles of any part, such pain may be completely relieved and controlled by Chloral Hydrate. I do not say that all cases may be safely relieved by it; but the cases which would require such large doses of Chloral Hydrate in order to overcome muscular spasm as would tend to bring about fatal narcotism are very seldom met with, and are mainly those which would result fatally with or without treatment.

In the Medical and Surgical Journal of April 25, 1872, I published an article entitled "Chloral Hydrate in Rigid Os Uteri," which illustrates its action to produce relaxation of spasm of the uterine muscular fibres. The case (one of miscarriage) had been in progress many days when I was called; the patient was feverish, abdomen tender, the vagina hot and dry, and she was becoming rapidly exhausted. The uterine contractions had all the time been regular and powerful, yet ineffectual, owing to a spasmodic contraction of the os externum. The os externum felt thin and dry, as if bound round with whip-cord, and admitted but little more than the tip of the finger. I exhausted the usual remedies during the day I was in attendance, but without avail, until, thinking of Chloral Hydrate, I gave her 40 grs. at a dose, with the happiest result. Under its influence she slept about an hour,—the first sleep for three nights. At the expiration of that time she appeared to be in pain, and on examination the fœtus was found in the vagina, and the case terminated satisfactorily. She made a rapid and perfect recovery. From that day, in all cases where I have wanted an inhibitory influence upon spasmodic action, whenever I have wanted to control excessive or abnormal uterine contraction, I have used Chloral Hydrate, and it has never failed once to act quickly, kindly, and as effectually as in the case above cited.

I will briefly mention two other cases, recently treated,

which illustrate the favorable action of Chloral Hydrate. Miss T., 24 years old, a patient of a neighboring physician, came under my care for a few days. She had a severe attack of spasmodic dysmenorrhea, which had lasted several days. While she was under its influence, Chloral Hydrate relieved the terrible pain which she suffered during the abnormal action of the uterine muscles. The contracted muscles of the uterus relaxed, and the menstrual flow was established. She made a quick recovery.

I was called to Mrs. C., a woman 27 years old, in her third confinement. She was suffering from unusually severe cramps in her abdomen, and her screams could be heard all over the neighborhood. On discovering the cause of the distress, I ordered a Chloral Hydrate mixture. Before it was obtained, however, I succeeded in delivering her of a fine boy. Soon after the placenta was removed, and after I had ascertained that the womb, vagina, and perineum were in a normal condition, she again commenced to make the most piercing shrieks, complaining of cramps in the abdomen. I gave her at once twenty grains of Chloral, and repeated it frequently, which controlled the cramps, and the intense pain resulting from them ceased. I remained with her several hours; leaving directions that the medicine be given every two hours, or as often as needed to control pain. Six hours later I found her comfortable; but it required regular doses of the Chloral during the following two days to relieve the spasmodic action in the abdomen. This case, after various accidents not necessary to relate here, made a perfect recovery.

In that form of dystocia resulting from irregularity of the labor pains, when one part of the uterine wall contracts while the rest remains in a state of inaction; or in those cases where there is no interval between the contractions, only interrupted by paroxysms, during which the intensity of the suffering is extreme, — denominated uterine tetanus; in spasmodic stricture of the os externum and the so-called

hour-glass contraction of the uterus: in all these, and in analogous cases, not due to organic changes, Chloral Hydrate will effect speedy relief; and, I firmly believe, will be found far superior to bleeding, tepid baths, emollient injections, opiates, and other remedies indicated by authors for these conditions.

Chloral Hydrate, from its power to prevent coagulation of the blood, must possess a great value as a prophylactic, when there exists a condition of the system tending to cardiac thrombosis or pulmonary embolism. This not unfrequently occurs in cases where the fibrine of the blood is abnormally increased, as after severe hemorrhages, fevers, croup, diphtheria, and more particularly in the puerperal state. An appalling suddenness of attack characterizes the majority of these cases. In Playfair's account of cardiac thrombosis, he says: "Nothing in the condition of the patient need have given rise to the least suspicion of impending mischief, when, all at once, an intense and horrible dyspnœa comes on; the patient gasps and struggles for breath, tears off the coverings from her chest, in a vain endeavor to get more air; and, too often, dies in a few minutes, long before medical aid can be had, with the symptoms of asphyxia. The muscles of the face and thorax are violently agitated in the attempts to oxygenate the blood; the extreme embarrassment of the circulation is shown by the tumultuous and irregular action of the heart in its vain endeavor to send the venous blood through the obstructed arteries; soon it gets exhausted, as shown by the feeble and fluttering beat. The pulse is thread-like, and nearly imperceptible; the respirations short and hurried; but air may be heard entering the lungs freely. The intelligence is unimpaired during the struggle, and the dreadful consciousness of impending death adds not a little to the patient's sufferings, and to the terror of the scene."

Any remedial agent that would tend to prevent such a termination in obstetric cases is devoutly wished for, and

would be gladly made use of as a prophylactic. Chloral Hydrate would theoretically seem to meet this indication.

From my studies upon this remedy, and my use of it in practice, I learn —

1. That Chloral Hydrate may be safely and efficiently given in labor to relieve the pains of normal and abnormal uterine contractions.

2. That it suspends all reflex action and resulting pains which tend to retard labor.

3. That, under the influence of Chloral Hydrate, labor is of much shorter duration.

4. That its employment to relieve pain is most satisfactory when the pain is caused by spasmodic muscular contractions.

It may be the opinion of some who have given little thought to the action of Chloral Hydrate, that the statements I have made about it are those of an enthusiast, and that when put to the proof they will not stand the test of practice. Let us see. It is through the system of nerves passing to and from the ganglia of the sympathetic nervous system that the effects of any toxic agent, or any cause of spasmodic action, is conducted. We have seen that Chloral Hydrate may be given to the extent of overcoming the severest spasm; and that its action is primarily upon the ganglia of the great sympathetic nervous system. We should naturally infer from these facts that its remedial action would first take place in the organs over which this system presides, before any of its toxic influence would be exerted upon the general system. This is what actually takes place, as demonstrated to my satisfaction; and I fully believe that this medicine will satisfy all who give it a fair trial.

DISCUSSION.

Dr. Weeks remarked that he had had a similarly favorable experience with the drug; but he was afraid of it. In a case of pneumonia in a child, two grains had been ordered every two hours, up

to a certain point. His directions were somewhat exceeded, and in the morning he found the child in a state of collapse, which ended in death. The uncertainty of the remedy had made him distrustful of it; at times it occasioned uncontrollable excitement, and at other times profound sleep.

Dr. Warner, for obvious reasons, was not familiar with the drug in obstetrical practice; but he had used it considerably in chronic gynecological cases, and regarded it with much less favor than formerly. He had also been annoyed by its occasional excitant influence.

Dr. W. Symington Brown had observed the excitant influence complained of under circumstances of continuous employment, and thought that it should seldom be thus used. We must use caution in our resort to the drug, as we would with opium. There was the same danger of formation of an evil habit. Chloral Hydrate is the best antispasmodic we possess. If its virtues depend upon its conversion into chloroform in the blood, we can easily understand its uncertainty of operation; for chloroform is the most treacherous drug known to the profession. He had learned not to keep Chloral Hydrate in solution; it should always be kept in the dark, and dissolved when needed.

Dr. M. L. Brown, in reply to a statement of Dr. Warner that opium had equal antispasmodic virtues with Chloral, insisted that with the latter we wholly escape the unfortunate after-effects due to opium. He believed that Chloral was especially indicated and exceptionally safe where pain is present, and pain depending upon extensive reflex irritation accompanied by spasm.

Dr. Field confessed to a strong feeling of surprise at the general distrust expressed in regard to a remedy which he had come to regard as indispensable. He had not used Chloral Hydrate in parturition, because, when he used anything, he had depended upon chloroform. This powerful remedy, dangerous or uncertain elsewhere, was safe here. He believed that Chloral Hydrate was particularly safe with the young. He had repeatedly prescribed five grains to a child under two years of age, as a sleeping draught, with orders to repeat once after one hour if the effect were insufficient; and he felt perfectly safe, in suitable cases, to follow this course. Chloral Hydrate, in toxic dose, is believed to act primarily upon the heart, and subordinately on the respiratory

centre; and the heart, at least, ought to be especially strong in young subjects. But there must be no grave interference, on the part of disease, with the respiratory centre when Chloral is to be given; and he could understand how the remedy might act adversely in the pneumonia case reported by Dr. Weeks.

Chloral Hydrate should either be avoided, or be given in greatly diminished quantity in conditions indicating marked hyperalkalinity of the blood. The same remark applies to decided asthenia of the heart, and, probably, in emphatic cerebral congestion or inflammation. It is also of the utmost importance that the Chloral we use should be pure. For the most part, he could indorse the conclusions presented in the paper.

Dr. Norris said that he had never used chloroform in parturition, but, of late years, had largely resorted to Chloral Hydrate. His practice is to give fifteen grains, and very often to repeat every fifteen minutes until the patient has taken one drachm in all. He generally adds Bromide of Potassium to the mixture, in the ratio of one part of the latter to two of Chloral. He related a case where previous experience had prepared him for a tedious labor, but in which the relaxing influence of the mixture was so marked that the child was born almost before he could get ready to receive it.

Dr. Field was sure that much mischief had been done by giving the salt in insufficient dilution. In some reports of deaths, it was evident that herein lay the secret of the mishap, although the reporter was apparently unconscious of the fact. Concentrated Chloral is a dangerous remedy, even within the limits of a therapeutical dose, and may kill, just as a massive dose of oxalic acid sometimes does, almost instantly, by shock and paralysis of the heart.

Dr. Clarke remarked that his experience with Chloral Hydrate during and after delivery had been satisfactory. He gave it for after-pains with great relief. Now, however, he generally uses Croton Chloral, because it can be given in smaller doses, and occasions less burning of the mouth and throat.

Dr. Stoddard had seen no bad effects from Chloral in obstetric practice. If prostration were to follow after delivery, he should hesitate to attribute it to the remedy, as it may depend upon many other causes, and appears often in those who have not taken the drug.

Dr. Marcy said he was in Berlin when Leibreich introduced his new remedy, had daily opportunities to witness its remarkable effects, and afterwards saw what was done with it in London. Dr. Mead, of Dublin, gave a mixture containing one ounce of the salt to a stout Irishman; a teaspoonful to be taken at a time, and repeated as often as necessary; and the man took the whole of it. He slept four days. Everything was tried to awaken him without avail; he finally awoke of himself, and suffered no discomfort, but said he had been on a spree.

Soon after getting home, he was called to a healthy-looking girl plunged in violent hysterical mania. He gave her one drachm Chloral, in divided doses; she went to sleep, and never awoke. He felt at the time that the drug killed her, and that he was himself, in a sense, *particeps criminis*. A thorough autopsy could discover no lesion anywhere. This case had taught him that Chloral should be thoroughly watched, if given at all.

POST-UTERINE ABSCESS.

BY MOSES D. CHURCH, M.D.,

OF CAMBRIDGEPORT, MASS.

Read Oct. 11, 1883.

It is comparatively recent that inflammation occurring within the pelvis, outside the uterus, has been recognized as a distinct affection; especially so in relation to differentiation between inflammation affecting the cellular or connective tissue and inflammation affecting the peritoneal coverings of the uterus. That the oldest authors had their attention attracted to the occurrence of abscess in the pelvis there is abundant evidence. But these writers did not distinguish between abscess of the uterus and surrounding structures. Observing that such abscesses, in the majority of instances, were connected with maternity, they thought that the formation of pus was due to a metastasis of milk; or it was considered due to a suppression of the lochia.

In the beginning of the present century the pathology of pelvic inflammation in women began to attract serious attention; limited, however, to one phase, — that in which pus was already formed, while other results escaped notice. About the year 1843 Dorhaty pointed out its comparative frequency, both in puerperal and non-puerperal patients. Other observers soon entered the arena of discussion; and, from that time to the present, great differences of opinion have prevailed.

When inflammation attacks the cellular tissue in the neighborhood of the uterus, it is now generally conceded to be the result of extension from some portion of the generative apparatus. Dr. Matthews Duncan asserts that it is most frequently the result of endometritis. The opinion

formerly prevailed that inflammation of the unimpregnated uterus was rare, while pelvic abscess was prevalent; but I think that, in a majority of cases, pelvic abscess and metritis are stages of one disease, and that whenever pelvic abscess is common, at that time and age metritis is common also.

The quantity of cellular tissue surrounding the uterus and its appendages is considerable; and when inflammatory products are formed, exudation takes place into its meshes, proportionally to the extent of inflammation. Connective tissue invests the several pelvic organs beneath the peritoneum, and exists in abundance between the vagina and rectum, the uterus and bladder, and the broad ligaments. From so broad a surface, inflammatory lesions may be extensive or limited according to the intensity of the inflammation, or the tissues may be involved by the mischief spreading from general peritonitis.

It is important to remember that pelvic cellulitis occurs both in puerperal and non-puerperal cases, and is not necessarily followed by abscess. Pus formation is only one of the results of cellulitis; the other pathological conditions being, first, congestion and effusion of serum; second, exudation of coagulable lymph. After inflammatory action passes beyond hyperemia, the effusion of serum is the earliest product. This gives rise to swelling of a more or less elastic character, which may be readily detected if the examination is made early. Even at a more advanced period, when the centre of the swollen tract is hard, a ring of softer tissues may often be felt at the circumference. Dr. Priestley says that in feeble patients, with impoverished blood, inflammation shows a tendency to stop at serous effusion, with proneness to spread extensively.

Whenever hyperemia exceeds certain limits, and serum is effused, the fluid creeps along, slowly or rapidly, and invades the surrounding parts. Under these circumstances, where the cellular tissue is bound by fascia, the degree of tension may be so great as to convey the impression of lymph deposit, or even that of a solid growth.

The exudation of coagulable lymph takes place when the inflammatory process reaches the second stage, which probably occurs in a majority of cases. The amount of deposit varies with the acuteness and duration of the disease. It may be so slight as to render it difficult to determine whether the exudation penetrates the meshes of connective membrane or is merely deposited on the peritoneal surface; or it may be so copious as to completely fill the pelvis. The most diagnostic characters of such a tumor are its hardness, irregularity, and immobility. The latter symptom is peculiar to cellulitis, producing an impression of resistance which is found in no other condition of the body. It has been likened to an organ around which fluid Plaster of Paris had been poured and allowed to harden. This hardness and immobility, however, only appear after some time has elapsed.

In a case which came under my care some two years ago, the exudation in the Douglas pouch assumed a rounded form, and it was a difficult question to decide whether the contents were serous or purulent. Gradually the smooth, round shape became irregular, the vaginal roof turned hard, and the uterus immovable.

Much has been written on the anatomy of the fasciæ in the female pelvis, with the intention of proving that serum or pus must follow a certain direction; but, practically, such theoretical arguments do not throw much light on the matter. It is a very difficult thing to prognosticate how far or in what direction pelvic effusions may extend.

When pelvic phlegmon is of moderate limits, it is generally found between the cervix uteri and the rectum, or in the direction of one of the broad ligaments. Occasionally it is found between the uterus and the bladder.

The formation of pus does not usually occur until from ten to fourteen days after the onset of an acute attack, and in some cases at a much later period. The evidence derived from fluctuation is frequently masked by the surrounding exudation of lymph; or it may be obscured by displaced fas-

cia. Large abscesses are sometimes formed by the breaking down of contiguous small ones. Two or more centres of suppuration may be formed, each bound down by its respective laminæ of fascia and thickened peritoneum. These may point in different directions, and open at different times. Sir Spencer Wells describes a case where a pelvic abscess discharged through the rectum, bladder, vagina, loin, and finally gravitated to the calf of the leg. Scanzoni relates another case where the autopsy showed that an abscess had penetrated through the muscular layers of the uterus. As to the most frequent point of exit, many observers say that in puerperal cases it is in the iliac region, through the abdominal walls; while, in non-puerperal cases, perforation occurs into the rectum.

Several cases have been recorded in which pelvic abscesses showed no tendency to burst at all. Dr. Matthews Duncan says he has "repeatedly opened such abscesses, whose existence antedated his seeing them by several years."

The treatment, both medicinal and surgical, is by no means uniform. The modern idea tends to simplification of remedies. More reliance is placed on the hygienic and dietetic management of such cases than in the specific action of drugs. To sustain the strength of the patient by suitable food, to allay pain and procure sleep, especially in acute cases, seem to be the chief indications. Tonics are usually required in chronic cases.

Many physicians are opposed to any surgical interference; while others advocate early evacuation of pus or serum. It appears like rational surgery to treat pelvic peritonitis and cellulitis as similar diseases are treated elsewhere. I think that most pelvic abscesses, when mature, open spontaneously. Why, then, should we be in haste to open them before they mature, more especially since early opening does not prevent other spontaneous openings? When we decide to open such abscesses, the median line, behind the

cervix (unless the tumor points towards the rectum), seems to be the preferable point for puncture; and an incision sufficiently large to allow complete evacuation should be made, and a drainage tube inserted. Antiseptic injections should be used while the discharge continues.

The conclusions I have arrived at, from careful reading of various authors and a limited experience, are:—

1. That parametritis and perimetritis are rarely, if ever, idiopathic in their origin.

2. That their causes are, — mechanical injury; uterine, tubal, or ovarian disease of an inflammatory nature, sometimes tuberculous or malignant.

3. That there is no evidence to prove that post-uterine abscess is the result of cold, suppression of milk or lochial discharge.

The questions relating to etiology, worthy of special attention, are:—

a. At what time of life is a woman comparatively safe from an attack of perimetritis or parametritis?

b. How long is the especially dangerous period after delivery, uterine operations, an attack of gonorrhea, or an attempt to replace a retroflexed or retroverted womb?

DISCUSSION.

Dr. M. L. Brown referred to a class of cases, not considered by Dr. Church, where we have what may be called a peri-uterine abscess. In such occasional cases, where death had followed, the patient might have been saved had the diagnosis been made earlier, and the pus evacuated. Such cases sometimes break into the peritoneal sac, and cause death; whereas the abscess which Dr. Church had described is more apt to make for the surface, burrowing under the sheaths of muscles.

Dr. Clarke related an interesting case. Mrs. —— had been married five years, but never had a living child. He found her sitting up, complaining of pain in the bladder and left groin; she had had chills. Repeated vaginal examinations failed to discover

any marked point of tenderness. Later, a small quantity of pus was discovered, but its source could not be determined. The following year she was seized with all her old symptoms; but, having moved from her former residence, she called in an eminent surgeon connected with the Boston City Hospital. This surgeon did not believe that she had ever had an abscess. After a short time Dr. C. was again called to take charge. With the help of a Sims' speculum, he was so fortunate as to detect a point where there seemed to be fluctuation, and let out a large amount of fetid pus, to the great relief of the patient.

Dr. WEEKS recalled a case where a Boston physician had attempted to replace a retroverted uterus, allowing the patient immediately after to return to her home in Chelsea. A week afterwards, Dr. Weeks detected fluctuation, and, with Dr. Warner's assistance, had aspirated. The woman never fully recovered; the uterus was low down in the pelvis, and the contiguous tissues were hard, contracted, and unyielding. It is important to make an early diagnosis, and evacuate as soon as possible. As to treatment, he had used mercuric chloride, hot injections, iodine applied locally, and rest.

Dr. WHEELER emphasized the difficulty of getting to the bottom of the sac, as the disposition of the deep fasciæ causes the pus to appear at the most unlooked-for points. We make an opening at a point so remote from the primary abscess that we have a long, fistulous passage, and cannot tell what the lowest point is. In one of Dr. Weeks's cases, he opened in five places, but could never detect a point of fluctuation internally. The patient suffered for three years from these fistulous openings, before final closure and recovery.

Dr. STODDARD applied the same criticism to Dr. Clarke's case.

Dr. CHURCH said that at least three authors report cases in which constitutional symptoms were present, but no local signs of pus. It was surmised that there was an opening into the bowel so high up that the pus mingled with feces, and thus escaped detection.

Dr. W. S. BROWN thought that Dr. Matthews Duncan sometimes made too nice distinctions. The relation of gonorrhea to pelvic abscess was of much interest. He had at present a case under observation, in which both husband and wife admitted such

origin. In such cases, veins and lymphatics are also affected, and the patient suffers from wandering pains. As to treatment, one thing seems essential, — early evacuation, washing out the cavity, and drainage. Prompt diagnosis is of the utmost importance. Here is an argument in favor of making vaginal examinations. Some surgeons are afraid to make a free opening, on account of the risk of hemorrhage. A good method is to make a small opening at first, and dilate it afterwards with an Ellinger or Keith dilator, which tears the tissues, and leaves an opening not so liable to close early.

Dr. Church proposed the question: When called to a case of a week's duration, with a history of pain, where a soft spot is found, but no evidence of fluctuation is afforded, should an incision be made at a venture, or should the physician wait?

Dr. Wheeler replied: If there are well-marked constitutional symptoms, with hardness, indicating presence of pus, it is no longer necessary to wait for fluctuation, now that we have the aspirator. There is too common a fear that we shall do the patient harm by interference; but we rather do harm by waiting, as the pus will burrow, and, not being in contact with the air, occasion but little trouble to the patient until it finds an opening: then the mischief is done, as in Dr. Clarke's case.

Dr. Weeks estimated that seven days was a short time for pus to be formed in such a case. Moreover, we should not expect pus until after the chills and sweating. We hardly get fluctuation in this region so much as the so-called bagging.

Dr. Norris referred to a class of subjects who have what may be called *pyrotechnic* pelves, — inflammatory patients, who are always ready to take fire on slight provocation. Such persons are pretty sure to have and make trouble after any surgical operation. He had a case in mind to whom mischief came after every confinement, four in succession. She would have an inflammatory attack even after the passage of a sound. He should expect such subjects to cause extra trouble in the disease under discussion.

Dr. Field added: And they are not to be recognized by any sign or condition they carry about them. This should serve as a warning against gynecological interference — even to the passage of Simpson's sound — at the physician's office, the woman being expected to go home afterward. The uterine patient should

always be treated upon her own bed, where she can be kept absolutely still from the moment that the examination is completed or the application made, for an hour or a day or two afterward, as the case may be.

PUERPERAL METRITIS, COMPLICATED BY MALARIA.

BY ALBERT L. NORRIS, M.D.,

OF CAMBRIDGEPORT, MASS.

Read June 5, 1879.

MRS. S., aged 24 years, married eighteen months, with husband living in Cambridge, in a home of comfortable affluence. She was delivered on Sunday, April 6, 1879, at about 5 o'clock P. M., of her first child (female), weight six pounds. First stage of labor, ten and a half hours, normal for a nervous patient. Second stage severe, of three hours, completed with ether and forceps; the mechanical part easy of accomplishment. Third stage unimportant, placenta following in about fifteen minutes; some coagula removed by the hand; uterus then contracting firmly. Slight laceration of perineum (not unusual in primiparous deliveries), less than half an inch in extent, was at once brought together by a single silver wire suture, under ether. Patient bandaged, and left, an hour later, perfectly comfortable. She was visited again in four hours, and found happy and cheerful, and so left for the night.

Monday, 7 A. M. Pulse, 120; Temperature, 104°. Nurse reported a slight chill between four and five o'clock; Lochia abundant. I ordered Carbolic Acid vaginal injections. Same evening, Pulse, 128; Temperature, 104½°. Patient seemed about the same as in the morning, expressing herself as comfortable, but a little nervous. Lochia abundant, but somewhat offensive. Ordered Carbolic Acid injections every hour until fresher, and then every two hours. Prescribed Veratrum Viride and Quinia.

April 8, Tuesday morning. Pulse, 132; Temperature,

150°. Continue the Veratrum Vir. gtts. v., Quinia grs. v., and gr. x. Bromide Potassium, opium at night. At 6 P.M., Pulse, 140; Temperature, 106°. Dr. Morrill Wyman was called in consultation at 9.30 P.M. Pulse, 136; Temperature, 105½°. Wednesday, 1 o'clock, A.M. Pulse, 120; Temperature, 103½°. The carbolic hot-water douche has been continued. At the suggestion of Dr. Wyman egg-nog was given. A five per cent. solution of Salycilate Soda was injected per vaginam.

Wed., 10 A.M. Pulse, 128; Temperature, 103⅕°; countenance better; she desires to evacuate the bowels. Gave rectal enema, with good effect. Prescribed a stimulating diet and Quinia. Found that the nurse fretted the patient, feeling averse to her for manifest incompetence. The new nurse came in the afternoon, and the patient felt pleased and reassured. Pulse, 104; Temperature, 101 4/10°. Facial expression good; renewed hope and confidence.

Thursday, 2.30 A.M. Pulse, 100; Temperature, 100½°. Patient complains of pain in breasts and back. Repeat morphia, and apply Ung. Bellad. ℥ss carefully to breast. I left her at 3 A.M. sound asleep.

8½ P.M. Patient somewhat nervous and anxious. Pulse, 120; Temperature, 101 5/10°. Milk being secreted; lochia improving in quantity and quality.

Friday morning. Pulse, 100; Temperature, 100°. Symptoms all improved. I noticed, as I had done before, a disagreeable odor in lower hall on entering the house, as if coming from the cellar, and increased at first landing, where a water-closet is located.

Saturday morning. Pulse, 128; Temperature, 104 2/10°. Appearance a little flushed and excited. Nourishment as before. Veratrum Vir., which had been omitted for about two days, now resumed.

At 11 P.M., Pulse, 120; Temperature, 103⅕°; resting under the influence of Morphia and Bromide Potassium.

On Sunday the Pulse fell to 96, and the Temperature to

98½°. She slept most of the past night, feels rested, and looks better. Urine normal in quantity and quality; no trace of albumen.

Monday morning. Pulse, 92; Temperature, 98$\frac{4}{10}$°; omit Veratrum Vir., continue Quinia, brandy and milk. Patient had a natural dejection, and two of a liquid character. Gave ℥j. Tr. Opii. Co., and put patient on champagne, lime-water and water. She has vomited twice to-day, probably from the Veratrum.

Tuesday, April 15. Pulse, 120; Temperature, 103½°. Patient converses, says she feels well, looks a little flushed; slept well. She has had a little tenderness over the region of right ovary.

Wednesday morning, 16th. Pulse, 104; Temperature, 100°. Removed the silver suture from perineum. Left her comfortable: two dejections. 1.45 P.M., notified by telegraph to see Mrs. S. Found her Pulse 144, Temperature 105°. She had had a severe rigor and chill at noon; chill just over as I arrived; reaction stage of heat and sweating; patient and family much excited. The nurse had given hot sherry wine, and applied heat. Ordered Veratrum Vir., six to eight drops, hourly; on examination found no milk in breasts, no phlebitis, no abdominal tenderness, but complains of hot eye-balls. She had had a slight paroxysmal headache a few hours previous to my visit.

Thursday, April 17. Pulse, 104; Temperature, 101$\frac{6}{10}$°. The report is,—slept well, no dejection, no chill night or morning.

April 18th. Pulse, 88; Temperature, 98$\frac{4}{10}$°. In the early evening she had a severe chill, lasting some twenty minutes. Pulse, 120; Temperature, 104°. Gave her brandy, and applied heat; also stupes of camphor and turpentine with opium.

April 19th. Pulse, 108; Temperature, 101$\frac{4}{10}$°. Patient looks better. The nurse says that she slept most of the night, with ʒi Tr. Opii. by enema. By physical exploration

found some slight pelvic cellulitis; no fluctuation, only thickening. Uterus movable.

April 20. Pulse, 108; Temperature, $98\frac{6}{10}°$; she has taken three pints of milk, and brandy and milk one pint; looks somewhat anxious, had in the evening administered ʒi. Tr. Opii. per rectum, and applied Empl. Canth. over the right ovary.

April 21. The patient looks and says she feels better; on vaginal examination found os uteri somewhat patulous, with lateral fullness in region of the right ovary; no tenderness. Hot-water carbolic douches, repeated at least every two hours.

April 22. Pulse, 120; Temperature $102\frac{4}{10}°$. A pint and a half of urine during the night. Mouth dry, tongue furred. The nurse said that she had been quite feverish during the last part of the night. She sat up in bed five minutes.

April 23. Pulse, 120; Temperature, 102°; Respiration 20, but looks anxious. Had her bowels opened by injection yesterday. The nurse reports some additional show of fresh lochia, red, with no odor. Below and above stairs in the house I observed a very disagreeable odor, worse to-day than before. On personal inspection, I found a faulty drain and open cess-pool in the cellar, and the water-closet absolutely without ventilation, except through the door. The cess-pool was very offensive; it had not been cleared out for over two years. The sink-spouts in both kitchens were foul, with a strong odor of sewer gas. This investigation much displeased the parents of the patient, who lived in and owned the house.

April 24. A good ventilator put in the water-closet to-day. The patient ate part of a squab for dinner, laughs and enjoys a joke to-night. Give codeia at night.

April 27 (three weeks from date of confinement). At this visit I find that the patient has been up in an arm-chair for half an hour, and feels better for it. Patient had a beautiful night's rest. I found her sitting up, tongue clear, coun-

tenance good, no lochial discharge, no fever ; says she feels well again. The patient and all in the house note the great improvement from ventilation of the cellar and water-closet.

CAUSE.

It would lead us too far to consider all those theories which have been brought forward to explain the occurrence of puerperal fever, were it only from an historical point of view. No single monograph extant is better than the admirable essay of Dr. O. W. Holmes on Puerperal Fever, published in 1855. Eisenmann and Silberschimdt discuss the subject very completely. Recently two opinions have contended for supremacy. According to the one, puerperal fever is due to a miasma formed by the crowding together of puerperal women, or to defective drainage and inadequate ventilation. According to the other, it is due to the absorption of septic material. The purely miasmatic theory—namely, that puerperal fever is due to infection from a specific material formed under atmospheric, cosmic, and telluric influence, which, acting exclusively upon puerperal women, causes this fever—is perhaps tenable. And the opinion is still somewhat prevalent that puerperal fever is, like typhus, of miasmatic origin ; and that, under suitable conditions, the diseased organism may reproduce the virus, and propagate it to other predisposed individuals. Dr. T. Addis Emmett says : "I have frequently met with congestive hypertrophy among females who had lived in some of the malarial districts of the Southern States. This enlargement of the uterus remained as one of the sequelæ of repeated attacks of intermittent fever, after the condition of the general system had become impaired. The venous congestion of the pelvis, with the enlargement of the uterus, was brought about, after the vessels had lost their tone, from the frequent backing up and obstruction to the return circulation through the portal system."

We have in Cambridge a zone or belt of district lying along the borders of marshy land in the Charles River basin, where, during the past few years, have occurred something like a score of cases of "Intermittent Fever," of malarial origin, indigenous to that region; and this case should be classed as in that district. Mother and child did exceptionally well afterwards.

DISCUSSION.

Dr. E. Cutter called the attention of the members to a new method of water-closet ventilation, which was being introduced by the Chadwick Lead Company of Boston. The principle is very simple. A pipe leading from the water-closet waste-pipe is connected with the ordinary water-back of a range or stove, and another pipe connected with the other end of the water-back communicates with the chimney; thus a strong current is created from the water-closet waste-pipe through the heated water-back up the chimney. Dr. Cutter had tested the apparatus by placing dry cotton in the pipe leading from the water-closet, and had found no organic germs; thus proving that they had been destroyed by the high temperature.

Dr. Pinkham criticized the title of Dr. Norris's paper, saying that it seemed to him to resemble puerperal septicæmia, rather than metritis.

The President did not agree with Dr. Pinkham, but considered it to be genuine blood-poisoning from extraneous influences, that is, from deficient drainage. He commended the masterly work accomplished by Prof. O. W. Holmes in his essay on "Puerperal Fever."

Dr. Weeks did not recognize defective drainage as always a direct cause of disease.

Dr. Marcy said that in these modern days, when sanitation is assuming such prominence, we are very likely to exaggerate the influence of deficient drainage as a direct cause of disease. It is easier to assume than to prove this. He had known some striking cases in which whole families had lived in apparent health for years among very unsanitary surroundings.

Dr. Warner said that he did not consider that drainage poison was always a direct cause of disease; but, if the system is in a susceptible condition, any of the various diseases resulting from it are liable to occur.

Dr. H. R. Storer thought that there was a difference in individual susceptibility to blood-poisoning, and while deficient drainage might often be the occasion, rather than the cause, of certain diseases, it is nevertheless philosophical, in view of the striking cases which have occurred, to consider it often, in relation to diseases or epidemics, the physician's duty to thoroughly investigate the sanitary condition of the surroundings of the sick.

Dr. Pinkham said: It is evident that defective sanitation favors the spread of disease, even when it is not the direct cause. In the last epidemic of diphtheria in Lynn, six hundred cases recovered, and most of them among those who lived in the least salubrious parts of the city.

BACTERIA IN PARTURITION.

BY HENRY O. MARCY, A.M., M.D., LL.D.,

OF BOSTON, MASS.

Read January 8, 1885.

BEFORE this Society, in 1879, in a paper on Antiseptics in Midwifery, I advocated that an instrumental labor should be conducted with all the antiseptic care and precaution of a major surgical operation. Then I found myself without support; even now I do not expect all to accept such a proposition. If the subject was by any means settled, or such principles adopted, your attention would not be called to its discussion. Few topics in the entire realm of medicine hold to-day a deeper or more wide-spread interest; for which we are indebted in America, in no small degree, to the valuable paper by Dr. Thomas, delivered last year before the New-York Academy of Medicine, and the reply of his equally distinguished opponent, Dr. Fordyce Barker, followed by a number of other contributors, of scarcely less note, holding various views. The pendulum of thought is never still. Upon certain phases of this subject it appears to have swung to the opposite, until now, in Harvard and other schools, it is taught that antiseptic injections should be used in all cases of normal labor as a routine practice.

Dr. Z. B. Adams, of Framingham, in a vigorous paper read in Boston this past winter, takes strong ground against the routine use of the vaginal douche in normal labor. He claims that under such conditions the douche is not only useless, but may be harmful and injurious. Dr. Adams cited several cases in which serious results, death even, had supervened. Five or six fatal cases were reported in the experience of the members present, where it appeared

probable that the result was due to the use of the douche. The discussion was earnest and long-continued, with evidence of a wide difference of opinion. It should not be difficult, abstractly, to state the problem which, in this way at least, is one of extreme simplicity. If we accept the doctrine that parturition normally is a physiological process, that the uterus is a closed aseptic cavity before delivery, the one danger to be apprehended lies in the introduction, after delivery has been effected, of a new abnormal or pathological element into the recently emptied organ. This new factor, according to our recent knowledge and belief, is due to the development of a bacterial ferment. Many erroneous doctrines are still taught in regard to the processes of reproduction, especially of the placental development.

There can be little doubt that the catamenial decidua is the product which is elaborated by the uterine glands. This is equally true of the uterine decidua (*decidua vera*) of pregnancy. The numerous openings or holes, which give the appearance of a sieve to the decidua, only indicate the points corresponding to the orifices of the utricular glands in the cavity of the uterus, which remain fully open to allow the constant passage of the product of secretion. In the early period of pregnancy, this secretion is doubtless furnished for the nutrition of the fœtus; later this is elaborated by the complex glandular organ, of new formation, which we call the placenta. The serotinal cells are elaborated from the submucous layer of connective tissue, and, when separated as a more or less perfectly formed placenta, there takes place an extensive traumatic lesion of the uterus, on account of the laceration of the parts, which leaves bare the uterine tissue that had been covered by the placenta. The muscular contraction and rapid shrinkage of the organ reduce the size and cavity, and at the same time aid in hastening the proliferation and expulsion of the broken-down and necrosed material. Physiologically, this must be an aseptic process. If the pathological factor lies in the

ferment or bacterial poisoning, how may this be introduced? Certainly from without. If excluded from the air, or any foreign body, the uterus, even to its cervical portion, may be likened in its injuries to a subcutaneous wound. When not undergoing change from fermentation, the lochial secretion remains a non-irritant, innocous fluid, although swarming with broken-down and even necrosed cellular debris. From this standpoint of view, we must take exception to the position assumed by Dr. Thomas above referred to, as well as many others, both in Europe and America.

Dr. Thomas states that "the lochia is in every case the offensive fluid; that it is made up of dead and decaying animal tissue." True, it contains dead, cast-off tissue, and is always a highly albuminous fluid,—just the material for the feeding, in their rapid growth, of micro-organisms, when accidently introduced into this most efficient incubating chamber. Normally they certainly are not present; and, when absent, decay or ferment cannot occur. Whence come the micro-organisms, the ferment necessary as seed? Is it auto-genetic, normally found in the parturient canal? If so, why does not every woman suffer in confinement from septicemia?

Is it likely that, of all organic functions, the one upon which the continuance of the species depends, and which is common to all animal life, should, as Dr. Adams pertinently remarks, be that which acts only under conditions tending to decay and death; that is to say, under conditions of disease? Micro-organisms are usually found in the vagina in health. Would this give us the seed for the sowing of the direful harvest? Evidently such belief pertains to most who have advocated, as preventive, vaginal injections both before and after the completion of labor. This appears to be the weak point in Dr. Thomas's position, and almost the only effective argument used by Dr. Barker against him in reply.

The history of the ages shows that the mortality of nor-

mal labor of the entire animal kingdom is very small. No one emphasizes the fact more clearly than Dr. Thomas, that, in all primal labors at least, there are, as as a rule, solutions of continuity, both cervical, vaginal, and perineal. In the normal labor, the outflow for a few days is constant in current, the drainage of the vaginal canal is usually excellent, and yet this albuminous material, as found upon the napkin or external parts, is generally of a decided odor, and, when carefully examined microscopically, is found swarming with bacteria-termo, these most useful of Nature's scavengers, the omnipresent agents for taking to pieces and refitting for other uses albuminoid compounds. In this form of micro-organism we rarely have danger, and, when we consider the normal conditions present, we readily see why we do not find these growths in the uterine cavity. Although I am as earnest an advocate for cleanliness as any other, this fact will explain why, amid filthy surroundings, the unwashed, unchanged, uncared-for woman so very generally makes a good convalescence. In a theoretical way, it is possible for us to consider that the bacteria-termo of decomposition serve a useful end, by utilizing and exhausting the material otherwise sufficient to feed an army of most dangerous enemies.

Dr. Thomas advises a careful disinfection, closing and sealing of all perineal and vaginal rents. Most excellent advice, and surgically very important, which we hope to see generally adopted; but, when we remember that he advocates this with the distinct object of lessening the danger or obviating the cause of puerperal fever, we can but think he becomes unintentionally misleading, and in so far fails of his purpose, for we cannot believe that Dr. Thomas means to teach that septic absorption from the injuries of the ostium vaginæ is the cause of puerperal fever. At the most, these are open wounds of tissues of comparatively little importance, and would certainly endanger the patient in a degree no greater than after operations for perineal restora-

tion ; and we do not suppose our distinguished friend would consider a dangerous septic poisoning at all likely to supervene upon perineal repair.

The above argument would not hold good in laceration of the cervix, since this is the part of an organ which has undergone a most marked physiological change. The vascularization of the uterus and pelvis at term is extraordinary ; the lymphatic system has become equally developed, until the physiological state is one nearly akin to certain well-recognized pathological conditions. However, it is not shown that puerperal fever is especially liable in primal labors, and yet it is generally accepted by all that cervical lacerations are far more frequent, in a certain degree rarely absent, in first confinements. It would seem that, even here, something more is wanting than the initial lesions under ordinary conditions to induce the dreaded dangers incident to so-called puerperal fever. Careful cleanliness before and at labor should be enjoined, and a strong antiseptic vaginal douche before delivery may be wisely advised. The circumfusa of the patient are taken into account by Dr. Thomas. A specially prepared room, with every surgical precaution, and an aseptic atmosphere, are emphasized and enjoined, — even to wiping the furniture with carbolic or bichloride solutions. This is certainly safe, and of no great importance, so far as expense or trouble is concerned. It is a consideration, however, unless really demanded, if we may not cause thereby serious foreboding and unnecessary nervous trepidation on the part of the patient, and the overlooking or neglect of the more important factors on the part of the medical attendant. It will certainly not be required if the delivery is normal, and normal labor accepted as an aseptic condition, equivalent to a subcutaneous surgical operation.

Let us suppose that the labor no longer remains normal, but that manipulative interference becomes necessary. Here the entire phase of the question is changed; and,

under these conditions, I would emphasize the use of the most thorough antiseptic surgical precautions. Our proceedings are now subject, in large measure, to atmospheric exposure, and here we need an aseptic atmosphere. In home as well as hospital, let its purification be enforced. I have for years, in instrumental labors, believed in and used the spray, in addition to other precautions. It certainly can do no harm, and may be of the greatest value. Infinitely more important, however, is the aseptic state of the operator. If the physician has been attendant upon infectious diseases, he should take a bath, change his entire clothing, pay particular attention to his hair and beard; scrub his hands, especially under the nails, with 1 to 20 carbolic solution, or 1 to 1000 mercuric bichloride. The same care must be used with instruments. In all cases where the placenta has been detached manually, let the uterine cavity be antiseptically treated, ergot given, and the uterus kept in control until firmly contracted. Then iodoform may be wisely introduced into the vagina, and a compress applied externally, moistened by a reliable antiseptic solution.

Why are these precautions dogmatically asserted as arbitrary rules? Without special review, simply because they are based upon the same general principles which govern in surgery. Are puerperal poisonings and surgical poisonings, then, essentially the same? Of this there can be little doubt. As I have insisted above, the bacteria of decomposition have probably no causal relation thereto. It is the round-cell growth, the micrococcus, which is active here, as in the septicemia of wounds. The bacteria of decomposition do not readily reproduce themselves in the blood of animals, and, when injected therein, rarely do more than serve as a more or less active chemical irritant. This is not true of the micrococcus. Under favorable conditions, which are so very general in the pregnant state, they effect lodgement, and colonize with a rapidity entirely inconceivable. Such seed introduced into such a favorable soil must yield an abundant harvest.

The planting ground, however, is rarely the vagina, but is found in the uterine cavity. It is difficult to conceive of an incubating chamber presenting more favorable conditions. The albuminous fluid furnishing abundant food, the heat point steadily maintained, open sinuses, lacerated vessels, denuded walls, through which ramify an abundant network of lymphatic vessels, — all furnish conditions for generation and absorption rarely equalled. Carried along with the lymph stream, they are distributed to neighboring and often distant organs. They not seldom form thrombi in the veins, and as such are carried into the circulation.

The micrococcal development is all the more dangerous since it is accompanied by no marked odor, and I fear many have been and are accustomed to determine conditions by such imperfect and unsatisfactory methods. When once infected, have we means within our power for remedying the evil? Here, again, the conditions are much the same as in surgical septicemia. Washing out the uterus does not prevent the mischief already done to the neighboring tissues. Dr. Lusk tersely and forcibly puts the argument as follows. "The douche, however, is not infallible. In cases where there has been inoculation of the round bacteria, they often invade the tissues beyond the original lesion, and it is of small avail to wash out the uterus when the victorious army has advanced far away from the point of attack. Washing the arm daily after vaccination does not prevent the development of vaccinia. Washing out the uterus, after the pelvic tissues are infiltrated with septic microspores, may cut off the re-enforcements, but does not prevent the progress of puerperal septicemia. I would advise, therefore, not to continue the uterine douche in cases where the result of the first thorough injection fail to furnish the evidence of its importance."

In my own experience, I have treated the uterine cavity as I would an infected, suppurating, sloughy wound. I do not hesitate to remove with blunt curette any irregular

placental masses from the uterine cavity, and, in a number of instances, have thoroughly applied the liquefied crystals of carbolic acid. This, I believe, may be safely used, since the acid coagulates the albuminoids, and is thereby not readily absorbed, while it acts as a local stimulant to the surrounding tissues, and makes them less absorbent. I have also often introduced a considerable quantity, fifteen to thirty grains, of iodoform within the uterine cavity, and allowed it to remain.

The relation of erysipelas to puerperal fever has long been suspected, and was first advocated as a cause in Boston. An unfortunate series of cases occurring in the practice of a brother physician, within the year, is worthy of notice. Following a case of erysipelas early in January, there supervened in his practice five fatal cases of puerperal fever, the last developed at about the tenth day, erysipelas following what seemed a slight abrasion in the middle line over the coccyx up the back, and then diffusing laterally, until it became general, and, before death, had extended over the larger portion of the body. I inoculated sterilized bulbs at the bedside with fluid taken, with much care, directly from within the cervical cavity. Micrococci in a pure culture were reproduced in rapid growths, and in appearance they could not be differentiated from the micrococci in the cultures from the blisters of erysipelas.

Too much importance has undoubtedly been placed upon the use of injections. We think Dr. Adams and others have shown that they are, in normal labor, at least of doubtful benefit, and not seldom dangerous. The douches, doubtless, often carry the very infection for the destruction of which they are employed. Who of us has not seen the use of dirty, unboiled water with serene composure, because, forsooth, a little of some doubtful antiseptic had been added thereto? Danger lies even in the hand of experts of world-wide fame. Under date of November 14, 1884, Dr. H. G. Bigelow writes me from Berlin that Schröder has lost three

cases from intra-uterine injection; in the last case 1 to 1,000 mercuric bichloride was used. Dr. Adams pertinently remarks that some authorities advocate the use of one kind of syringe and some another, laying blame to the instrument instead of the method.

We have already attempted to show that in normal labor it is not required, while it is too plainly apparent that after the disease has developed, and micrococcal poisoning has supervened, the intra-uterine douche often fails to secure the desired result. Earlier I believed differently, and gave much thought to the perfecting of a double soft-rubber injection tube for this very purpose. Experience in Europe as well as in America clearly teaches the great importance of the subject, and the salvation of lives in large numbers has undoubtedly followed the more or less wise precautionary measures adopted.

Dr. E. W. Cushing, of Boston, writes to me from Berlin: "The acceptance of the germ theory is universal, and its application is most incredible in thoroughness. The habit of washing out the vagina after childbirth, in cases which give no evidence of infection, has been entirely given up in the well-regulated German hospitals as unnecessary where proper care and cleanliness prevails, the washing both inside and outside being done with the utmost thoroughness *before*, not after, parturition."

A better general understanding of the subject will aid in carrying on the good work. "I will show you my faith by my works," said the apostle of old. One must understand the great underlying principles of antiseptic surgery, and accept them *in belief*, in order to carry them wisely into effect. Let the facts be adduced, and the reasons clearly shown for the innovations demanded, else they will be relegated to the systems and fashions of fallacies in the medical art.

DISCUSSION.

Dr. W. S. Brown was inclined to be skeptical in regard to

the causal relation of micro-organisms to the troubles of lying-in women. He thought that the tube of the syringe might do harm, and cause hemorrhage. He never used the douche, unless he had reason to believe that there was some noxious material to wash out. He found filling the spaces under the finger-nails with softened soap a convenient and efficient means of preventing infection from that source.

Dr. H. C. White had had no case of puerperal fever in twenty-five years of practice. He did not use the douche, unless it was specially indicated. Aside from thorough cleanliness, he had adopted no Listerian precautions.

Dr. W. H. Grainger had not used antiseptics for fifteen years, even in cases of forceps or turning. He thought that septicemia was likely to follow post-partum hemorrhage, and always gave ergot and quinine in such cases. He had used intra-uterine injections only three times in his practice.

UTERINE FIBROID WITH PELVIC CELLULITIS.

BY MARY E. BATES, M.D.

OF NEWTON CENTRE, MASS.

Read September 15, 1887.

About the middle of April, 1887, Mrs. C., of Lexington, Ky., came to me for treatment. She secured board in Boston, and came by appointment to my office in Newton Centre. The patient was a slim, middle-aged woman, forty-six years of age; she looked pale and anemic. Mrs. C. fancied that she had some obscure disease, as her case had been variously diagnosticated by different physicians, and she came to me hoping to learn the real nature of her trouble. I ascertained that she had been a widow twenty years, and had given birth to one child, who was still living. For several years she had been subject to menorrhagia, with occasional attacks of severe pain in the right inguinal region. These attacks were diagnosticated as neuralgia, and lasted but a few days, although at one time the pain continued several weeks.

By palpation, I discovered in the right iliac region a small bunch about the size of a goose's egg. The uterus was movable, and, by aid of the speculum, I found that there was no metritis. I could not conveniently pass the sound, as there seemed to be a mass nearly filling the uterine cavity. I could not reach the bunch with my finger, which I felt sure was there. So I told the patient that I was not through with the examination, and desired the aid of counsel with some able physician.

The result of this counsel was,—a diagnosis of an interstitial fibroid tumor, situated in the right lateral portion of the fundus. We both advised the patient, on account of her age, to do nothing whatever, unless she flowed profusely; to

go back to her home and her family physician, to whom I would write, stating the nature of her trouble. With this, and other simple directions, I dismissed the patient. About one week later, I received a note from her daughter, requesting me to see her mother, as she was menstruating and quite ill. I telegraphed to her that I had a very sick patient whom I could not leave that night, and recommended her to call a physician whom I knew in that locality. Several days later, the attending physician sent for me. I found Mrs. C. suffering from a severe attack of peritonitis. All the symptoms were present,—pain, nausea, profuse perspiration, and thirst. I learned that the patient had been mounting three flights of stairs several times a day, that her room had not been sufficiently warm, and that she had not eaten well. She had been advised to have the tumor removed, and I found her very much bent in that direction; still she would make no move without my sanction. I quieted her mind by telling her that she was too ill to even think about an operation, and that later on we would talk it over, secure further advice, and, if thought wise, we would operate.

A few days later, the attending physician wrote to me that Mrs. C was growing worse, and he thought that the patient would never recover in these city rooms.

After the inflammation was subdued, and as soon as we considered it safe, she was removed to my own house in Newton Centre. For ten days, under rest and good diet, she slowly improved; then menstruation occurred, followed by peritonitis, as in the previous month. At this time the uterus was fixed,—the fundus lying in the right iliac region, the cervix pointing to the left; the bladder lay in the same oblique line, as I learned by passing the sound.

I gave morphia for the peritonitis,—enough to keep her quiet, an eighth of a grain a day usually being sufficient. Thirst was allayed by bits of ice, with occasional swallows of hot water.

She was fed on Carnrick's food and beef tea alternately,

in small quantities, often repeated. She could not take milk. The abdomen was kept covered with absorbent cotton. The abdominal walls were considerably distended while the patient was ill in Boston, and also after she came to my house, but much more so at this time, the general appearance being very much like that of a woman seven months advanced in pregnancy. For several days the temperature was 101° in the morning and 102° at night, afterwards declining until nearly normal. Hyperesthesia of the abdomen was present, and the inguinal glands were enlarged and tender. A large and specially sensitive mass could be felt in the region of the left ovary, leading me to suspect the presence of an abscess. This, together with the discouraging general condition of the patient, led me to call for additional counsel. The physician whom I called, and for whose opinion I had great respect, thought that the great and rapid distention might turn out to be a sarcoma, and that the patient would probably die, but that it would be advisable to perform laparotomy, and learn the true state of things.

I watched the case closely, treating her upon general principles, giving her all the nourishment she could bear; morphine enough to quiet pain; plenty of fresh air night and day; and gentle massage daily. After her menstruation ceased, I ordered vaginal injections of from six to ten quarts of very hot water, to be repeated twice a day. After a time the abdominal walls began to soften, and I thought that I discovered fluctuation in the left inguinal region, at a little below the umbilicus. I reasoned that pus in the former place might escape by the vagina, but if pus formed higher, that alarmed me. There was still a good deal of local peritonitis, and to aspirate would probably rekindle it.

There was no pronounced chill, but there was a rise of temperature. I gave her enough quinine to produce the physiological effect, but the stomach was unable to bear it. I accordingly substituted salicine in thirty-grain doses, which lowered the temperature, and was nicely borne by the stom-

ach. I ordered raw eggs, milk, and old Irish whiskey, to maintain her strength.

I still feared the worst, however, and called in a new consultant,—a recognized high authority on tumors. He advised continuous poulticing to bring a point to the surface, if possible. There existed so much diffuse cellulitis, and the vitality of the patient was so low, that poulticing seemed to be the only safe method. I followed it up carefully until I was convinced that it did no good. I was nearly in despair about the case, when the patient was attacked with diarrhœa, —her usual habit having been constipation. To my surprise, the fluctuation in the abdomen entirely disappeared, and she soon began to feel better. The diarrhœa continued several weeks. Meantime pus escaped from the vagina, and the left inguinal bunch also disappeared. I infer that there must have been an opening into the intestines. I administered carbolic acid in drop doses, which helped to relieve the extreme flatulence.

The patient is still at my house. She has a fair appetite. The temperature is nearly normal. Her bowels are returning to their former state; and when the fæces are formed she suffers pain during defecation. She takes a fair amount of nourishment, feels moderately strong, but does not sit up much. She is somewhat emaciated, and the outlook is only for a slow recovery. She does not menstruate at all.

Now the question is, Was the peritonitis started by changes in the fibroid tumor, or by pre-existing cellulitis? Perhaps the patient's mode of life had something to do with it.

DISCUSSION.

Dr. Henry O. Marcy opened the discussion. He said he had seen the case, and coincided with the writer. He was fully satisfied from the history of the case that pelvic abscess was to be expected, and hoped he would hear from the case again.

Dr. A. P. Clarke said that he had a case several years ago that resembled this in many respects, in which an abscess formed,

and death resulted from exhaustion. The patient had passed the menopause. He thought ergot or ergotine might be of use.

Dr. Bates said that the patient thought the passage of the sound had caused the abscess, and asked if such a cause was probable?

Dr. Clarke inquired if difficulty was experienced in passing the sound?

Dr. Bates said no. Profuse flooding had existed for years, and led her to suspect the existence of myoma.

Dr. Clarke remarked that the specimens exhibited upon the screen, illustrating the continued use of ergot and ergotine for years, might suggest the treatment proper in this case. He thought the sounding of the uterus could cause little or no disturbance.

Dr. I. W. Starbird recalled a case of developing ovarian tumor, where no sound had been passed, and two or three well-marked attacks of subacute peritonitis occurred. At first no tumor was suspected, but afterwards it reached a weight of sixty pounds.

Dr. Bates said she suspected no tumor at first, and had not taken measurements. She afterwards agreed with Dr. John Homans that a tumor was present that grew for a while, though not for the past six weeks. She said the fixed uterus and adhesions were now the source of trouble.

Dr. H. C. White said Prof. Daniel T. Nelson had three ways of treating fibroids; viz., by ergot, by electricity, and by letting them alone.

Dr. Bates asked whether the galvanic or Faradic current should be used?

Dr. Nelson stated that the galvanic current was generally employed.

Dr. White said that Dr. F. H. Martin, of Chicago, used puncture for submucous fibroids; but that interstitial forms were not amenable to this treatment.

Dr. W. S. Brown wished that Dr. E. Cutter had remained. The latter performed electrolysis in 1870.

Drs. Cutter and Kimball operated August 29, 1870, on a patient of mine in Melrose, unsuccessfully. Dr. Cutter operated on a large fibroid in Stoneham, on a patient of the late Dr. Wm. F. Stevens. The tumor diminished to one-half its original size, and

the patient has been well ever since. Dr. Cutter also operated on a case in Chelsea before the late Dr. J. Marion Sims. The battery used by Dr. Cutter consists of six large cells. This he prefers to the large number of small cells usually employed in electrolysis. Dr. Brown said that many tumors called fibroids were not fibroids at all, but hæmatoceles. He knew of six of such cases. He, Dr. Brown, considers laparotomy the true treatment of fibroid. He has operated on one case as large as a child's head, using the ecraseur. In answer to a question by Dr. Bates, Dr. Brown said the operator should remove all the adnexa. If a patient was comfortable, it was best not to operate; but in a case like the one in question laparotomy should be performed to relieve the flooding. He has successfully treated two cases with Squibb's Fl. Ext. Ergot.

Dr. A. L. Norris was much interested in the valuable paper of Dr. Bates. He remembered a case of the kind, complicated with peritonitis and multiple abscesses, where there was great exhaustion and a fatal termination. The patient was thirty-two years old, and had never borne children, although she had had several miscarriages, with subsequent debility and chronic induration. He had employed ergot in both submucous and interstitial fibromata several times. In two cases it was attended with marked success, not only controlling hemorrhage, but ablating perceptibly the growth, which after five months ceased to give trouble. The lack of time prevented him from reviewing data, otherwise he could have narrated more cases of interest bearing upon this subject.

Dr. Clarke stated that Apostoli showed that the diminution of a fibroid after the use of electrolysis was due to shock. In 4,000 cases of fibroid, collated by Prof. Nelson, 256 derived benefit from the use of ergot.

Dr. Bates inquired if ergot did not often fail?

Dr. Clarke agreed with Dr. Nelson that failure may be expected in subperitoneal cases. The submucous forms are most benefited by ergot.

Dr. White thought the sense of the Congress was that a contraction of the muscular fibre was effected by ergot. Dr. Apostoli knew cases of old prolapse that were helped by faradization.

Dr. F. L. Burt said he had seen more surgical cases than medical. The poor quality of ergot is often the cause of failure.

He saturates cotton with the fluid extract, and applies it in the vagina.

Dr. Starbird thought the injection of ergot into a fibroid, as done by Dr. W. S. Brown, a novel practice.

Dr. White thought that the mouth was the best and most natural way to administer ergot. He has at present a case of fibroid where the patient measures forty-eight inches around the umbilicus, and the tumor is supposed to weigh about twenty pounds. Only one out of many consultants advised its removal. Ergot controlled the flooding, and at present the patient has passed the menopause.

SEPTICEMIA.

BY WILLIAM G. WHEELER, M.D.,

OF CHELSEA, MASS.

Read June 21, 1888.

I PROPOSE to report to this society a few cases of Blood Poisoning, in order to emphasize some points which seem connected with the practical question of modern wound treatment. Blood Poisoning is a grave accident, which frequently follows in the wake of surgical operations, and it is studied to-day with intense interest and from various standpoints.

In the brief time allotted me I will not try to repeat the plausible theories and suggestions as to the changes in the chemistry of the blood, or to reproduce here upon slides and shades the revelations of the microscope, or to reveal the secrets of the laboratory, which have given such prominence to germs as an important factor in the causation of disease; although there is no doubt that the theory plays an important part to-day in the domain of operative surgery. In approaching the subject of Blood Poisoning from any point, we find various views and opinions as to the practical question of wound treatment taught by the leading surgeons of the day. In what little I have to say upon this subject, I will not enter upon the general question of modern wound treatment, and all it involves; but will limit myself to the consideration of some points which relate to abdominal sections, embracing ovariotomies, the removal of uterine fibroids and tumors from the peritoneal cavity, etc.

One word with regard to Listerism. This White Elephant I find directly in my pathway; and I care not to disturb his meditations. The principles upon which this practice is founded were practised many centuries since. Our ances-

tors, in this regard, built better than they knew. For if you consult the early history of our art, and ask about the ancient treatment of wounds and other surgical procedures, would they not, in our day, seem rather heroic, or somewhat barbarous? For instance: in slight bleeding, our early ancestors used strong styptics; for open arteries, the actual cautery was applied; and leaking stumps and gaping wounds were hermetically sealed with molten pitch. They dreamed not of the germ theory; but their practice was Listerism with a vengeance, and perhaps it was as effectual in their day and generation as ours. It is true that their patients were heroically treated; and just as heroically were the ancient germs treated, if they had any in those days. To-day we all know that dry heat is a powerful germicide,—the red-hot iron a sure hemostatic, and hot pitch would prove a more perfect barrier to germs than Mackintosh or Lister's carbolized gauze.

"The thing that hath been it is that which shall be; and that which is done is that which shall be done; and there is no new thing under the sun."

These lines were written centuries before the days of Hippocrates, and are as true now as then.

Like the confusion of tongues at the building of the tower of Babel, let me ask, Does not the multiplicity of terms used in books serve to confuse and mislead the mind of the student? Let us seek for a definition of Septicemia, simple and yet broad enough to cover the whole ground.

Mr. Bryant, of London, in his recent work on Surgery, says: "In inflammatory fever, surgical or traumatic fever, septicemia, ichorrhemia, puerperal fever, and pyemia, may all be considered so many different names for and manifestations of one condition, — namely, blood poisoning."

Aitken, in his Clinical Medicine, says: "The multiplicity of views and great uncertainty which still pertains to many points regarding the pathology of the symptoms comprehended under these names makes it necessary to write

with doubt and speak with hesitation." Dr. Thomas, in a recent paper before the New-York Academy of Medicine, said: "It was difficult to give an exact definition of 'puerperal fever;' but that he was willing to adopt any which did not acknowledge the affection to be septicemia, no matter what form it assumed. The cause of the disease was absorption of a poison by solution of continuity along the genital tract. On the other hand, the term 'puerperal septicemia' conveys a clear and definite idea as to the nature of the disease, and in spite of the fact that complications were so frequent. The many post-mortem appearances were only so many pathological changes in the different tissues, forming secondary lesions in the destructive course of the disease. This view does not militate against the existence of a specific contagion, which may come in or act as a cause of the malady. The laceration of the cervix, or any portion of the mucous membrane, may serve as the open door; the puerperal diathesis furnishing a soil and the pabulum for future development. The modern nomenclature and its refinements, or the later pathological distinctions without a difference, I will not enter upon here."

The earlier ovariotomists seldom allude to blood poisoning as a sequel to the operation; and those who do, remark that pyemia comes first, and then, at some later day, septicemia. Prof. E. R. Peaslee reports six or seven cases of this accident, treated by drainage, as detailed in his work on "Ovarian Tumors." Mr. Clay, Sir Spencer Wells, Atlee, Kimball, and Thomas hold the same opinions. Some years ago, J. Marion Sims published a paper upon the treatment of abdominal wounds, and suggested drainage through the Douglas fossa. He expresses views somewhat different from others; namely, that septicemia may develop in a few hours, and that death may occur in twelve, twenty-four, or forty-eight hours after the operation. There can be no doubt that the adoption of the drainage tube was a great surgical advance; but I am confident that septic material

may gain access to the circulation, and thus pollute the blood. Surface absorption from a small wound may be sufficient to infect the system, rendering the drainage tube powerless. Where blind pockets of septic material collect, drainage is needed; and there are many cases when thorough drainage is our only resource to save the patient.

I now purpose to briefly describe three cases, in order to emphasize the following points: —

First. That blood poisoning may and does complicate low forms of disease. We see it in dysentery and typhoid fever.

Second. That septicemia often complicates the after treatment in ovariotomy, and is more frequently a cause of death than was formerly supposed.

Third. Blood Poisoning increases the hazard, and has been considered by some as a bar to surgical interference with extra-and even intra-uterine fibroids.

Case I. was a uterine polypus, fibroid in character, pedunculated. The patient was a widow, now approaching the age of forty-three, mother of four children. For some two years she had been failing in health, and for the last eighteen months she had suffered from frequent exhausting attacks of menorrhagia. She had become anemic, complained of defective vision, giddiness, with throbbing heart and head. She was confined to the sofa or bed. A digital examination revealed a small firm tumor, about the size and shape of a Sickel pear, attached to the anterior wall of the uterine cavity, midway between the internal os and the fundus. After some preparatory treatment, to improve her general condition, the os was dilated by a carbolized tent, and the small pedicle severed by the wire ecraseur. The case progressed favorably up to the fourth day; at which time there was a sudden increase in pulse and temperature, alternating with chills. Nausea, vomiting, and diarrhœa set in. She also had pain in the pelvis and tenderness in the groin, with swelling along the line of the larger lymphatics; and soon both lower ex-

tremities became swollen and tender, followed by restlessness, with delirium and excitement.

In spite of active treatment, thorough drainage, and antiseptic washings, my patient just escaped with life; and it has taken more than a year for her to regain a moderate degree of health.

The growth was insignificant in size, and the operation unimportant; but the sequel serves to illustrate the fact that a small lesion is sometimes dangerous as well as a large one.

II. This was an intra-uterine fibroid, the size of a duck's egg. The patient was a woman about forty-one years of age, unmarried. She began to menstruate rather late, and continued regular and normal in character until three years ago, when her general health began to suffer from severe menorrhagia. An anemic condition supervened, and the last three months had been marked by a continuous flooding, with pain in the back and pelvis at intervals, simulating the pains of early labor.

The patient and her friends attributed these symptoms to the "change of life." She had been most of the time under medical treatment (principally heavy doses of morphine to relieve pain). When I was called, the patient was in a wretched condition, exhausted from the constant flooding and pain. She had been in bed about two months. No vaginal examination had been made. I found that the uterus was enlarged and anteverted, the os patulous, the walls and the cervix thin, as if drawn over something which could be touched by the finger. The sound swept around a growth which seemed movable in the lower part. This manipulation excited severe pain, expulsive in character, and also increased the hemorrhage, so as to cause her friends anxiety.

The diagnosis pointed to a fibroid growth, attached by a short pedicle to the fundus of the uterus. Her condition was such as to necessitate an early attempt to remove this growth. Two carbolized sponge tents were introduced, and retained by a tampon packing for twelve hours. The dilatation

produced was to allow the tumor to be brought low enough, so that the base of the pedicle was reached and severed by curved scissors. After the pedicle was divided, there was comparatively little bleeding. The uterus and vaginal cavities were packed with carbolized cotton, which remained twenty-four hours, then removed, and the whole cavity washed out with Kennison's uterine canula attached to a syringe, twice daily. The patient went through the operation better than her exhausted condition promised. At first no untoward symptoms appeared. The temperature and the pulse were very little excited, mostly free from pain, with but little tenderness of the abdomen; with an alvine discharge on the third day after the operation. These favorable symptoms continued on, with slight variations, until the night of the fifth day, when she complained of weakness, was restless, and asked for a stronger opiate. At this time there was tenderness over the lower abdomen; and toward morning of the sixth day she had a slight chill, sudden elevation of temperature (103°, pulse 115), with distress in stomach, and diarrhœa. There was great prostration of strength, mind clear, and anxious countenance; the skin bathed in perspiration. These untoward symptoms continued to increase in severity until the morning of the seventh day, when the right parotid gland became painful and swollen. Three or four days later its fellow enlarged; but pus did not show itself in any part of the body. Things continued to progress from bad to worse; and the patient died on the fourteenth day after the operation, from pyemic poisoning.

This case is highly instructive. Perhaps an earlier operation might have yielded a better result. How analogous to an early abortion is this case in its course and termination! A medical examiner, without access to her history, would be disposed to say, at the autopsy, that she died from the effects of a criminal abortion.

III. This was an ovarian monocyst, weighing twenty pounds, of about three years' growth, and of medium size.

The patient was thirty-five years of age; had been married five years; without children. Menstruation regular, but scanty; thin in flesh; general health fair. The operation was performed under spray, with Lister's precautions and dressings.

The special point to be noted in this case is, that I found extensive and firm adhesions on the right side, both back and front, including adhesions to the omentum and a portion of the small intestines. The pedicle was not large; it was transfixed, tied, and dropped back. Eighteen fine catgut ligatures were left on the omentum. The incision (four inches in length) was closed with six wire sutures. About fifteen hours later, the patient had reacted from the operation, with slight vomiting and little pain, followed by a reasonable amount of sleep. The pulse and temperature were nearly normal. The next morning her symptoms continued favorable. On the sixth day, tenderness and pain began in the right side and lower part of the abdomen, with increase of temperature and pulse. She was restless and unable to sleep; the stomach and bowels became irritable, with prostration, approaching coma, chills, and sweats. On the morning of the eighth day I detected a fullness in the lower part of the abdomen, right side, just under where the adhesions were found. At the lower angle of the wound I took out two wire sutures, passed in a new gum catheter, and was able to evacuate about three ounces of thin fluid (not pus), the color of prune juice, with an unpleasant odor. This cavity was washed twice or thrice a day with a weak solution of carbolic acid, alternating with a solution of boracic acid. From this hour the septicemic symptoms, which had been so threatening, abated, the pulse and temperature lowered, the stomach and bowels quieted, the coma disappeared, the mind cleared, the strength slowly returned, and my patient as it were came back to life again. In three months from the time of the operation she was able to return to her home and friends.

DISCUSSION.

Dr. L. F. Warner said that he had been much interested in the paper. The products of a wound, including the serous discharge, become poisonous when separated from the living body. The object of the older surgeons, in allowing a wound to glaze by exposure to the air, was to prevent any oozing into the wound cavity, and thus to prevent poisonous changes. The corrosive sublimate solution of the modern surgeon acts in the same way, by coagulating the albuminous elements of the tissues. These poisonous changes in the discharge from wounds take place very rapidly, and the fatal result may occur early. The exact character of this septic fluid is not known, and we do not yet know accurately what changes occur.

Dr. H. C. White said that he had enjoyed the paper very much. There are undoubtedly many forms of septicemia which are not yet recognized. Diphtheria, in its later stages at least, is a form of septicemia. His treatment of this disease has been based on this theory, and its success had strengthened his belief that all diseases of a septic character can be best treated by remedies which are directly antagonistic to the agents which cause the disease. The most common of these remedies are sulphurous acid, the sulphites, the hyposulphites, etc.

Experiments have proven that septic material injected into animals causes death, while exactly similar matter injected into an animal which is under the influence of antiseptic remedies does not cause death. Whenever you succeed in securing the full effect of such remedies in diphtheria, recovery may be expected.

Dr. R. C. McDonald said that he had used sulphurous acid and the sulphites with success, in different forms of septicemia.

Dr. A. P. Clarke said that antiseptic agents were used prior to our day, but with no definite understanding of their origin or mode of action. Even Lister believed that the germs of disease came from the air; but more recent investigations show that the infection of wounds more usually results from unclean hands and instruments. Dr. Clarke said that he had no faith in the employment of antiseptic drugs which act through the circulation.

Dr. Hanscom asked if it were possible to charge the blood with antiseptic agents to an extent sufficient to affect the general system?

Dr. L. F. Warner said, in reply, that we would kill our patient before that end was gained.

Dr. H. C. White said that our object in the use of such agents was to so sterilize the field that germs could not live.

Dr. M. L. Brown believed that we do not use sufficient local treatment in diphtheria. The disease is local at first, and vigorous local measures may cure it.

Dr. Jackson, of Fall River, a guest of the Society, said that his ideas in regard to the exact character of septicemia were shadowy. The first practical question which should be investigated and settled is, By what avenue does the disease germ enter the body? Is it by the air, by instruments, or is it developed in the organism itself? When this question is settled, then our remedies or agencies can be intelligently directed to guard the system from infection. In some forms of septicemia, sulphurous acid or the hyposulphites are of great value.

Dr. L. F. Warner, in referring to cholera, said that he had no fear of the germ, if it did not find a suitable home. As chloasma will not develop on the skin of a perfectly healthy person, and the pollen of the toad-stool will not germinate unless it finds congenial soil, so cholera will not attack a person who is well, and who lives among hygienic surroundings. Something must prepare the field for this disease, — as bad air, imperfect drainage, or improper food.

Dr. F. L. Burt said that we do not know the exact cause of trouble in wound infection, neither do we know certainly the exact relation of microbes to these changes. We do know, however, that germs always appear in wounds thus affected. Dr. Burt had had no experience with septicemia after surgical operations. There is no case of operation without some elevation of temperature; but it is a question whether this condition is identical with the process usually known as fever.

Dr. W. Symington Brown said that the paper was a very practical one. In considering a question like septicemia there were two elements to be treated, *i. e.*, the theory and the practice. In the past we have had too much theory. The captain of an

ocean steamer uses only known facts in controlling his vessel; so the surgeon should depend solely on what has been actually proven in his work. A man has only a certain amount of mental energy; if, then, a great part of this is expended in the study of theories, he has less to apply to the more practical work of his calling. There is much which we do not know in regard to poisoning by germs; and we do know that gases, developed in the animal organism, may cause death.

THE ROLE OF THE OVARY.

BY W. SYMINGTON BROWN, M.D.,

OF BOSTON, MASS.

Read Oct. 14, 1886.

I ASSURE you, gentlemen, that I thought twice before adopting this title,—one which exposes me to a double cross-fire of criticism, and may possibly end in depriving me of the chance to perform any *role* myself in this learned Society. First, there seems to appear the insinuation that the ovary is only a vagabond actor, not a citizen or legal voter in our body politic; and, second, after getting over that *pons asinorum*, that my title presupposes some sort of scheme or plan of creation in which the ovary has been set down to play a part. This comes of importing metaphysics into a gynecological society.

Let me hasten to explain, however, that I do not mean any thing disrespectful to the much-maligned ovary. If this important organ only acts a part, what then? Do we do any more? And as I believe that it takes a leading part in the great drama of Life,—a part which men are only too glad to support in a subordinate *role*,—of course there can be no disrespect intended. For this and other reasons, I object to the phrase "uterine appendages" as applied to the ovaries. It would be much more correct to say *ovarian* appendages; by which I mean the uterus, Fallopian tubes, ligaments, etc. For the ovary is the essential organ in the female, just as the testicle is in the male; they both originate in the same blastema.

The minute studies of pathologists are often useful. I do not attempt to decry them. But it seems to me that pathological minutiæ are like the scaffolding put up for

workmen during the erection of a building, intended to be removed when the building is finished. In fact, we cannot see the building in its fair proportions until the scaffolding has been removed. In other words, I think that we have depended too much on morbid phenomena, and too little on the experiments which Nature kindly performs for us. More can be learned by careful observation of natural processes, and guarded deductions therefrom, than from the twisted facts which disease presents us with. Naturally we cry up disease, for that is our business; but I am happy to say that the tendency in our day is to place more stress on the investigation of normal processes, so that we may be better able to recognize their deviations when they become abnormal. We have hitherto put the cart before the horse, and our partial progress has been attained by pushing instead of drawing. It is on this account that I attach comparatively little importance to vivisections as a means of discovery. Experiments on living animals may test or corroborate a great disclosure; they seldom or never find one out. It is the recollection of what we have previously observed, passed through our mental alembic, which enables us to discriminate differences and recognize agreements. While I despise the senseless, sentimental outcry now being raised against vivisections, I think it is our duty not to overestimate them, and to make such experiments the exception, not the rule. Sir Charles Bell, in his classical work on the "Nervous System," asserts that if he had commenced with experiments, they would have misled him. He made his great discovery by means of dissections and clinical observations.

The female generative organs apparently occupy a middle place between those devoted to nutrition and those which bring us into relation with the external world. They are a sort of bridge between the two, and partake of the character of both.

The extreme period during which the ovaries are active

may be set down as forty years,—say from twelve to fifty-two years of age. In the great majority of women, this period is limited to thirty years,—say from sixteen to forty-six years of age. Before twelve and after fifty-two the possession of procreative power in women rarely exists; although a few recorded cases point to its possibility. Men may retain their virile power to extreme old age.

In childhood, the ovaries only contain microscopic ova; and after the menopause these organs become atrophied, and all traces of germs finally disappear. In reproductive processes, nature seemes to be ultra-generous. The number of ova in each ovary is out of proportion to the number of possible children. Many of these ova, no doubt, remain undeveloped; but even of those which reach the surface, and are capable of impregnation, how small a portion ever fulfil their function! Then, again, during each month there is a period during which the ovary is quiescent, and another period during which it is active. These may be called the cycles of involution and evolution. When the latter attains its maximum force, the ovary becomes nearly twice as large as at the close of involution, and is so sensitive to pressure that a tyro might conclude that it was inflamed.

Strictly speaking, the ovary is a gland which secretes free cells. It maintains an intimate connection with many other glands,—a relationship more marked during pregnancy, but also noticeable during menstruation. More unsolved problems are probably connected with this relationship than is generally supposed. Jaundice, albuminuria, salivation, and mastodynia, may all be connected with, or dependent on, changes in the ovary. One reason why robust women (corresponding to the peasant class in Europe) recover more readily from puerperal diseases than pampered ladies, is the greater activity of the glandular system in that sort of patients. If we take puerperal albuminuria as an illustration, I think there need be no doubt that the affection does not arise from organic disease of the kidney, but is

simply a functional disorder, following sympathetic changes in one or more of the reproductive organs. Anything which interferes with a single link of the chain affects the whole.

If we except syphilis, perhaps no other disease pursues a more insidious course, or fathers so many obscure symptoms, as gonorrhea. Dr. Noeggerath, of New York, long ago directed our attention to this subject, and his assertions were generally met by the profession with almost scornful scepticism. I think that the sweeping verdict he passes upon commercial travellers is exaggerated; but the longer I live I meet with more and more cases which can only be satisfactorily explained on his theory — the existence of latent gonorrhea.

When I was a medical student, in 1841, I asked our professors of anatomy and obstetrics, separately, this question, Why do prostitutes so seldom conceive? The answer from both was substantially the same: they said, they are driven beyond conception by their mode of life. For many years, I could get no better answer than this from anybody. But modern gynecology has demonstrated that the gonorrheal discharge passes from the vagina through the uterus and Fallopian tubes to the ovaries, and, exciting periuterine inflammation, is the true cause of sterility in prostitutes, and also, I am sorry to say, in many virtuous, married women. Among the latter class especially, this is not always preceded by an acute attack. The affection may be communicated by a mild, concealed gleet, which the husband himself is not cognizant of. As Dr. Noeggerath has pointed out, poisonous mucus may lie in a shallow cul-de-sac, near the bladder, and be discharged along with the semen, during coition, months or even years after the patient has seen any discharge at the meatus.

I suppose that bacteriologists, if they admit the premises, would explain the infection by the presence of a specific germ, which the attending physician had failed to dislodge. I do not express any opinion on that head. As the

obliging showman says, "You pays your money, and you takes your choice." But whether caused by wicked germs or more ancient pathological processes, there can be no doubt about the widespread mischief resulting. The fibrous ovarian sheath becomes thickened, the Fallopian tubes are dilated with muco-pus, or closed, and it is probable that the ova themselves never become fully developed. If this happens to both ovaries or both oviducts, sterility is inevitable. We should also recollect that in many cases, where the epididymis has been inflamed, spermatozoa are not to be found in the semen, and the male is also sterile.

This brings us to the absorbing question, Should the ovaries ever be removed on account of metrorrhagia, salpingitis, long-continued agonizing pain, or any intractable pelvic disease? I refer, of course, to Battey's and Tait's operations. Many conservative physicians aver that the removal of the ovaries unsexes a woman,—changes her soft voice to a harsh, masculine tone, produces a beard and mustache, and takes away her sexual appetite. I think that all, or nearly all, of these charges are baseless. We have good reason to conclude that sexual desire is not annulled within a period of at least four years after either operation; and there is no probability that spaying results in sexual apathy at any time after puberty. Thousands of women possessing normal ovaries and tubes, and otherwise healthy, are quite insensible to venereal pleasures. The only thing these operations prevent is conception, and in our day that is not reckoned much of a curse by many women.

I am inclined to think that both the advocates and the opponents of female castration have been guilty of exaggeration. It is too true that the modern surgeon, like the American base-ballist, is apt to go to extremes. I have no doubt that some ovaries have been sacrificed which might and should have been saved; we are in too much of a hurry. And I am also quite sure that many women have been left to drag out a miserable existence for years, an opprobrium

to the healing art and a daily terror to their relatives, who might have been saved untold suffering by a simple surgical operation, if the medical attendants had not been befogged by this ancient dogma of unsexing their patients. For sex is not lodged in either ovary or testicle. If in one part more than another, it is in the brain.

A long series of careful observations have satisfied me that insanity in woman often depends upon sexual disorders, and in such cases can only be cured by treatment applied to the reproductive organs. The first case which impressed this conclusion upon me occurred in Blackstone, Mass., in 1852. The patient was a young married woman, of Irish extraction, under the care of the late Dr. Kimball. She showed signs of melancholic insanity, and tried to commit suicide by striking her head in more than twenty places with a dull hatchet. We dressed the scalp and got a neighbor to watch her; but on the second night, while the watcher dozed, she got out of doors and drowned herself. As it was a case for the coroner, we were privileged to make a *post-mortem* examination, and found extensive disease in the left ovary, with pus in the corresponding oviduct. This case also illustrates the insensibility to pain in most patients affected with reflex insanity. Under ordinary circumstances, one or two blows with a blunt hatchet would result in sufficient pain to deter repetition.

In hystero-epilepsy, where the fits are prolonged, and the mind is beginning to be affected in consequence of ovarian disease, the best treatment is to remove the tubes and ovaries. This is one of the grounds where even the most conservative practitioners admit that extirpation is justifiable. And where we have long-continued, excruciating pain, after all other remedies have failed, I think that we are warranted in removing the offending organs. There are other kinds of work besides child-bearing which women can acceptably perform.

I have only seen one case where I thought that the

operation was vindicable. She is an unmarried lady, about thirty years of age, who suffered from pelvic neuralgia for several years, and latterly was obliged to give up work entirely. All sorts of treatment had been tried, without avail. She was under Dr. Barss's care, who called me in consultation. The operation was performed about two years ago, while I was absent in Europe, and proved quite successful. I learned yesterday that, although both ovaries were removed, she has menstruated regularly since the operation was performed.

General practitioners are more interested in another class of patients, where the symptoms arise from suddenly arrested menstruation, and there is no good ground for believing that the ovaries are seriously diseased, and yet sterility is a common result. A brief account of a typical case will illustrate my meaning. Five years ago I attended a strong young lady, nineteen years of age, in whom menstruation was suddenly arrested by sea-bathing. Severe pelvic pain, vertex headache, and a sense of constriction in the diaphragm, continued at intervals for a year, notwithstanding active treatment. Finally she recovered, and six months later got married, but has never become pregnant. To this day the diaphragmatic constriction remains, and the menstrual flow is gradually becoming scantier. Whether a sufficient degree of low-grade inflammation existed to close both tubes, or, which is more probable, the nervous shock attendant on arrest of menstruation also arrested the development of ova, I cannot say. Only this, that in such cases I feel warranted in telling her relatives that sterility is highly probable.

I have only time left to state one or two other questions relating to my subject, without attempting to discuss them. Is menstruation inseparably connected with ovulation? To get a correct answer, we must bear in mind that rare instances have occurred where three ovaries existed, and also that stray ovisacs may exist in the human parovarium,

following the type of certain lower animals. In most cases, removal of both ovaries arrests menstruation within a few months. In Dr. H. R. Storer's celebrated Malden case, operated on September 23, 1865, where he removed every thing except an inch of the cervix uteri, menstruation recurred eighteen days afterward, and lasted thirty hours. She was unmarried, forty-seven years of age, and a virgin. The explanation seems to be that the original habit produces a species of physiological momentum that continues to operate in some women after castration has been performed. Sir Spencer Wells, Dr. W. L. Atlee, and others relate cases similar in character.

Negrier believes that the ovaries act alternately, one ovary being active one month, perfecting ova, while the other is quiescent, the latter becoming active next month. This somewhat fanciful theory receives a little support from the circumstance that, where only one ovary is diseased, the pain sometimes returns every alternate month.

Ovariotomy has decided one problem for us: It has proved that the sex of the fœtus does not depend on the particular ovary which furnishes the germ; that is, that the right ovary does not furnish males and the left ovary females, or *vice versa.* Sir Spencer Wells tells us that ten patients, from each of whom he removed one ovary, afterwards conceived and bore children of both sexes. A woman with only one ovary may even bear twins of opposite sexes.

The proportion of male and female children born, all over the world, is so constant that one cannot help concluding that it must be regulated by a physiological law, as yet undiscovered. This is a promising field for ambitious gynecologists. He or she who discovers that law is as sure of fame as William Harvey. If I might be allowed to hazard a suggestion, it would be this: that the determination of sex does not depend on any thing done by either the mother or the father, but occurs long prior to conception in the ovary

or testicle. That is to say, I believe that the agency which determines sex depends upon peculiarities in the ova or spermatozoa existing before coition.

One of the most interesting problems waiting solution is the sympathetic or metastatic affections connected with disease of the ovaries or uterus. Thus, it is quite common for patients with ovarian disease to be troubled with intolerance of light, double vision, and some other eye-disorders. The same thing is often observed during pregnancy. Have we a correlation of diseases as well as one of forces? The first time that my attention was forcibly directed to this subject, strange to say, was among soldiers. In 1864, we had an epidemic of mumps in the 55th Regiment Massachusetts Volunteers, (colored,) followed in eight or ten of the cases, by orchitis. The assistant-surgeon thought that it was merely a coincidence, and I was at first inclined to concur with him; but soon became satisfied that the two diseases were more closely related. Dr. Goodell, of Philadelphia, has an article on "Inflammation of the Parotid Glands following Operations on the Female Genital Organs," in Volume X., Transactions of American Gynæcological Society, which will amply repay perusal.

The only other example of sympathetic reaction I shall allude to to-day, is the increase of sexual desire in young women affected with phthisis. I have seen only one well-marked instance; but experienced medical friends say they are convinced of its occurrence. What is the cause? Is it an illustration of the tendency of plants to run to seed when debilitated through a deficiency of nourishment? Does the fact throw any light on the greater fecundity of poor families as compared with rich ones? Perhaps some member will be kind enough to solve, or try to solve, these problems for us.

DISCUSSION.

Dr. E. W. Cushing wished to thank Dr. Brown for his excellent paper. He agreed with him in regard to the importance of

gonorrhea as an agent in producing disease of the uterine appendages. These results may follow from an old gleet, when for years there has been no discharge at the meatus. In many cases the latent gleet can only be diagnosticated by a microscopical examination of the secretions of the urinary tract. In all cases the *gonococcus* can be found. Dr. Cushing expressed the opinion that nine-tenths of the inflammatory troubles peculiar to women arise from "the clap."

Dr. L. F. Warner did not believe that a slight gleet often caused ovaritis, metritis, or many of the other diseases so often attributed to gonorrhea. He did not think that Dr. Noeggerath's views upon that point had ever been generally accepted by the profession.

OBSERVATIONS ON OVARIOTOMY.

BY JOHN C. IRISH, M.D.,

OF LOWELL, MASS.

Read by title, Feb. 14, 1889.

In asking your attention to a subject so much discussed, talked of, and written about, one cannot hope to present anything new. Yet it is not always the new that alone is interesting or instructive. Repetition often improves and crystallizes the knowledge that we had acquired before. A brief consideration, therefore, of the proper time for performing ovariotomy, and of some details of the operation, may not be time entirely wasted. Among ovariotomists there is now no diversity of opinion as to the best time for the operation, namely, just as soon as the tumor is discovered. But among the general profession, among those who first see these patients, and who, to a great extent, determine the time of operation, a different opinion quite extensively prevails. Even at the present time many believe that an operation is hardly justifiable until the discomfort and feebleness of the patient actually compel interference. After all that has been said within the past three or four years in favor of early operations,—and after all the demonstrations of actual experience that have been accumulated, it would seem that nothing further need be said upon this subject. Still when we recall the history of this fatal doctrine, that ovariotomy should not be resorted to until the patient's general health is enfeebled, and how recently it was taught, we can understand how it still continues to exert its baneful influence.

In Dr. Peaslee's classical work upon "The Diagnosis and Treatment of Ovarian Tumors," published in 1872, he

advised that a woman with an ovarian tumor should not be submitted to an operation until her general health was impaired. He laid down this rule of action with such emphasis, and so thoroughly believed in its wisdom, that he imbued the whole professional mind of America with this dangerous doctrine. He followed in practice his own teaching, and had seventy-eight ovariotomies, with thirty-nine deaths. In regard to the doctrine, no other comment is necessary. Dr. Peaslee's book became at once the standard authority on ovarian tumors and ovariotomy, as it well deserved to be in all other respects. From that time, every author in America who discussed ovariotomy, substantially reiterated his teaching in this matter. No longer ago than 1884, among American authorities there had not appeared a single exception. They all taught this mischievous principle. At this time I believe I had the honor to be the first in this country to raise a protest against it. When we remember that this was only five years ago, we can readily understand how many of the profession to-day still adhere to what was so recently the universal teaching of authors. I suspect that, to most of you, this will seem a tedious repetition of what has already been said over and over again in favor of early operations. Nevertheless, with my acquaintance among physicians, I feel that the repetition is needed. Among the twenty-five ovariotomies that I have performed during the past three years were three cases that had been tapped several times each, two cases of ruptured cysts, and four others with degenerated cyst walls, all ready to rupture. One was simply and entirely a victim of this teaching of delay, and the others escaped being so more by good fortune than anything else.

In still another way are its unfortunate results made apparent. So long as delay was the generally accepted rule of action here, American ovariotomists were far behind those of England in their proportion of recoveries; but, during the past two or three years, the results of American

operations have been fully equal in point of success to those of any in the world.

Among the details of ovariotomy, the preliminary preparations to avoid the danger of septic infection stand foremost in importance. I simply attempt to secure perfect cleanliness of the room, bed, nurse, assistants, ligatures, instruments, and sponges. Immediately before an operation the instruments are washed, and the silk boiled in a one-per-cent. solution of carbolic acid. The eye of every needle is cleaned with carbolized silk. It is doubtless true, as has been shown, that a one-per-cent. solution of carbolic acid is inefficient for the destruction of bacteria of any kind; yet, in my last thirty-nine cases of abdominal section, there has been but one death that could have been charged to sepsis, and in this one I have great doubt whether death was due to this cause. Not only have I had no other deaths from sepsis, but the patients who recovered were free from all septic poison, as their temperature charts have shown. At the present time, the best defence I know against our invisible foes — the bacteria — consists in absolute cleanliness. Within the abdominal cavity, I believe that any mercurial or carbolic solution is likely to be more dangerous than all the bacteria that are liable to get there.

A great deal has been said in favor of the shortest possible incision that will admit of the removal of the tumor. One three inches long I have found of sufficient length in simple cases; but where there are many adhesions, or much solid matter in the tumor, rendering its removal through a short incision difficult, I believe it to be much the safer course to make the cut long enough to allow free access to the adhesions. I have never seen that the length of the incision made the slightest difference in the after progress of the patient; while an attempt to drag out through an insufficient opening a partially solid or adherent cystoma often results in rupture of the sac, or in the separation of adhesions at points that give rise to troublesome hemorrhage out of

reach. In a word, I believe in making the incision just as long as the convenience of the operator demands.

The length of time occupied in performing an ovariotomy is an important element in deciding its success or failure. The moment that the abdominal cavity is opened, the patient experiences a shock, which becomes more and more profound during the time that the intra-peritoneal contents are being handled. This shock is much less apparent in some patients than in others, but it occurs in all. The manifestation of lowered vitality, or diminished power of resistance, measures, after a fashion, the amount of vital power that we are abstracting from the patient ; and, when this goes on for a certain length of time, her entire vital force succumbs. The shock may be continued long enough to be fatal ; the length of time necessary being in proportion to its intensity. When it has continued for a time, (not long enough to produce an immediately fatal result), there may have been an abstraction of vital power from the patient which may prove secondarily fatal, or, if not fatal, may have so diminished her power of resistance as to render her more susceptible to those accidental complications which now and then follow laparotomies of all kinds. Thus, the length of time of an operation may induce a shock that will prove fatal primarily, secondarily, or indirectly. It follows, therefore, that the most rapid operations consistent with care and gentleness in manipulation, all else being equal, will give the best results.

In connection with this matter, whenever blood or the contents of the tumor have escaped into the peritoneal cavity, they can be thoroughly removed by pouring in a large quantity of very warm water, and allowing it to run off. In this way all sponging, except in the posterior cul-de-sac, can be avoided, and a great saving of time effected. I notice lately that several writers assert that flushing the abdominal cavity in this manner necessitates the use of a drainage tube. I am sure that this is a mistake. I have been in the habit of

using water in the way indicated with good results, and have never inserted a drainage tube; nor have I been very particular about the water being entirely removed from the abdomen.

Long bands of adhesions, so often found connected with the omentum, should usually be ligated. These bands are especially liable to ooze, and the bleeding points are concealed beneath the omentum, or among the intestines. In ligating the pedicle, the Staffordshire or Tait's knot, now in general use, is one that requires special care in tying. Sometimes when it would seem to have been drawn very tightly, one or even both of the loops will be found inefficient.

Before closing the abdominal cavity, I always draw up the pedicle by the long ends of the ligature, which have not yet been cut, to assure myself that the bleeding has been entirely controlled. I have several times happened to find that the pedicle was not sufficiently constricted. Ligation in two separate sections, or more if the pedicle is large, is a simpler procedure, and, for a surgeon not accustomed to tie Tait's knot, a safer one. The only disadvantage of this is an occasional splitting of the pedicle below the ligature, which may result in a hemorrhage difficult to manage. An additional ligature, however, around the whole pedicle will usually control it. Whenever extensive adhesions have been broken up, rendering a considerable oozing of serum and blood into the peritoneal cavity probable, or whenever degenerated cyst-contents have escaped among the intestines, a drainage tube should be inserted. Under all other conditions that occur to me, I regard its employment as unnecessary, possibly harmful.

MICRO-ORGANISMS, AND THEIR RELATION TO DISEASE.

BY SAMUEL N. NELSON, A.M., M.D.

Read June 19, 1884.

THE role of the micro-organisms, called bacteria, is at present probably occupying the attention of more scientific men than any subject in modern science. Great numbers of observers are at work on both continents in the solution of the question of the germ theory of disease. Comparatively unknown till within a few years on account of their very minute size, these micro-organisms attracted attention and experimentation, chiefly when the improvement of the microscope allowed objects of their size to come within the limits of its powers of observation. At first simply recognized as existing, their persistence and universality demanded question as to what they are, their origin, and object.

The history of these micro-organisms is related to that of spontaneous generation, to that of the fermentations, to the pathogeny and therapeutics of a great number of virulent and contagious affections, and, in a more general manner, to all the unknown, which, notwithstanding the efforts of modern science, still surrounds the origin of life and its preservation.

The bacteria are the lowest of organisms belonging to the vegetable kingdom, and are thus defined by the botanists who have most recently occupied themselves with them: "Cells deprived of chlorophyl, of globular, oblong, or cylindrical form, sometimes sinuous or twisted, reproducing themselves partly by spores and by transverse division, living isolated or in cellular families, and having affinities

which approach them to the algæ, and especially to the oscillariæ."

The atmosphere transports myriads of microscopic plants and animals. M. Miguel has pursued interesting studies upon them. M. Poucher has devised the aëroscope that bears his name, for collecting dust from the air, which contains remnants of articles that we use, existing in the condition of impalpable dust, also pollen of plants, particles of mineral matter, and the spores of cryptogams, the moulds, and algæ. Some micrographers have suggested that germs may be transported by the vapor of water; but Miguel's experiments show that the evaporation of water from the ground never carries any schizomycetes with it. On the other hand, dry dust, especially from hospitals, etc., is charged with micro-organisms. The greatest labors, however, have been employed concerning a different class of organisms than the algæ and moulds. The plants comprising this group, under the common designation of *Bacteria*, in consequence of their extreme minuteness and refractive power are invisible in the preparations of the aëroscopes, and are recognized only by the higher powers of the microscope.

The first observer who recognized the micro-organisms was Leeuwenhoeck, as early as 1675. While examining with his magnifying glasses a drop of putrid water, the father of microscopy remarked with profound astonishment that it contained a multitude of little globules which moved with agility. During the following year he observed the presence of bacteria in feces and in tartar from the teeth.

M. Cohn is a naturalist who has occupied himself very much with the bacteria. In 1853, he published his first researches upon this subject, and, twenty years later, there appeared a series of "Memoirs" devoted to these organisms. In the first paper he gives an exposition of his researches upon the organization, development, and classification of the

bacteria, and upon their action as ferments. His classification is:—

1. The Sphærobacteria, or globular bacteria;
2. The Microbacteria, or rod bacteria;
3. The Desmobacteria, or filamentous bacteria;
4. The Spirobacteria, or spiral bacteria.

This classification has probably been accepted by more germ theorists of to-day than any other.

The smaller spherical bacteria may be confounded with various objects; *e. g.*, molecular granules, fat globules, amorphous precipitates, etc. To distinguish these pseudo-bacteria, Nägeli says: "There are but three distinctive signs which enable us to recognize with some certainty that granules under observation are organisms, — spontaneous movement, multiplication, and equality of dimensions, united with regularity of form;" to which may be added the action of reagents.

The atmosphere is laden with these micro-organisms. Developing in the organic infusions into which they fall, they soon determine their complete decomposition; for, during their growth, bacteria live upon the nutritive material, as all other plants do upon their soil. This is putrefaction, and they are always present as the cause. As is well known, bacteria are always present, in some form or other, in fermenting liquids. Fermentation only occurs after the access of particles from the outer world, and it is asserted by the supporters of the germ theory that these particles are organisms or their spores, and that it is by the growth of these organisms in the fermentiscible material that it undergoes alteration. The essentials for production of new forms are, — a putrescible body, water, and air; while heat, light, and electricity favor the process.

As Sir William Roberts says: "Without saprophytes there could be no putrefaction; and without putrefaction the waste material thrown off by the animal and vegetable kingdoms could not be consumed. Instead of being broken

up, as they now are, and restored to the earth and air in a fit state to nourish new generations of plants, they would remain as an intolerable incubus on the organic world. Plants would languish for want of nutriment, and animals would be hampered by their own excreta, and by the dead bodies of their mates and predecessors, — in short, the circle of life would be wanting an essential link. A large proportion of our food is prepared by the agency of saprophytes. We are indebted to certain bacteria for our butter, cheese, and vinegar. Our daily bread is made with yeast, and to the yeast plant (discovered in 1836 by Cagniard de la Tour, and also independently by Schwann about the same time) we also owe our wine, beer, and spirituous liquors. As the generator of alcohol, this tiny cell plays a larger part in the life of civilized man than any other tree or plant."

Unfortunately for us, however, they have a powerful potency for evil also; and it is the noble aim of science to be able, by thorough study of the conditions under which that potency is acquired and exerted, to keep it under efficient control.

Much still remains to be determined with regard to the disease-producing possibilities of the germs, that, in invisible clouds, drift in the atmosphere. The more delicate and exact methods of the most recent observers, — Koch, Pasteur, Tyndall, Ehrlich, Ogsten, Sternberg, and others,—with regard to their nature, seem to show that there are many varieties of them, each of which has its own conditions of growth, requiring or developing best in a particular soil; different species multiplying in different media, and varying in their susceptibility to different temperatures and to different chemical reagents. Apparent identity of form does not necessarily indicate identity of nature. They are not convertible into each other. Each species produces only itself, and is produced by itself alone; and, when introduced into a substance that affords a favorable soil for its growth, always produces the same results. These results are not produced

suddenly, but are of gradual development, progressing with the slow and steady multiplication of the organism. They may be cultivated artificially in either solid or liquid media. The best known and most commonly used solid medium is nutrient gelatine, which unites the advantage of transparency with that of solidity; but it has the disadvantage of melting at a comparatively low temperature. When it is desired to cultivate bacteria at a temperature approaching that of the human body, sterilized blood serum may be used; or a preparation of agar-agar, a Japanese sea moss. For liquid cultures a tube or bulb hermetically sealed, containing a sterilized infusion of hay or meat, is used, which will remain clear indefinitely. When, however, the germs are introduced in ever so minute quantity, they begin to develop, after a varying interval of one to twenty days, and then they rapidly increase The liquid infusion, previously clear and pellucid, becomes more or less cloudy or turbid. When in this condition, we may be sure of the presence of rapidly increasing micro-organisms in great numbers, as the microscope will invariably reveal.

It has been a widely disputed question as to whether bacteria ever occur in the animal in a perfectly healthy state, the affirmative view having been taken by Billroth and some others; but it is denied by Koch, by Pasteur, and by Ehrlich, who state that they have never detected bacteria in the healthy animal. The failure of putrefactive bacteria, according to experiments, would go to show inability to struggle against the normal cells indigenous to the soil upon which they were planted. Some bacteria showed power of existence only in tissue in which vitality had entirely ceased, while others seemed to possess the power of existence in the presence of the animal cells when the latter suffered from impairment of nutrition, and the tide of life was turning against them. Abnormal composition of the blood seemed to favor the development of some bacteria, after they had found their way into the tissues.

The theory of a causal relation between bacteria and diseased processes has recently received a wide acceptation. In some diseases this relation is established, while in others it is presumed on the ground that bacteria are found in the blood and diseased products. As additional evidence in favor of special bacteria for different diseases, the fact is advanced that bacteria found in different diseases have been discovered to have different morphological and chemical properties; to which may be added, of still greater value, the different appearances presented by the colonies growing upon solid culture media.

Admitting this causal relation of bacteria to disease, it must be demonstrated by successive cultures of the bacteria found to exist in the diseased person, and by the induction of the same disease in man or healthy animals by inoculation, with a reproduction of the bacteria. The first discovery of the association of a germ with disease was by Pollender, in 1849, who found certain rodlets in the blood of animals suffering with splenic fever, also variously known as anthrax, charbon, miltzbrand, malignant pustule, and wool-sorter's disease. The specific character of the parasite was afterwards pointed out by Davainé, and subsequently carefully investigated and confirmed by Pasteur and Koch. The bacillus can be isolated and developed in proper cultivating media, and when inoculated into some animals will produce splenic fever.

Again, in 1873, Obermeyer, of Berlin, discovered a bacterium in the blood of patients suffering from relapsing fever, which has been named Spirillum Obermeyeri. It is found only during the febrile paroxysm, disappearing during the interval. So far, attempts at cultivation have proved unsuccessful.

In March, 1882, Koch, of Berlin, announced the discovery of the bacillus tuberculosis, which he asserted to be the exciting cause of tuberculosis. His results have been confirmed by many observers, and the bacilli have been

found in the tubercles and sputa of persons suffering from phthisis. As you all know, they reproduce themselves when cultivated under proper conditions, and cause tuberculosis when inoculated into animals.

The discovery of the parasitic origin of glanders followed closely upon that of the bacillus of tuberculosis. This was also made in Koch's laboratory by Prof. Schultz and Dr. Loeffler; and the results were verified by pure cultures and inoculations.

Birch-Hirschfeld has confirmed the discovery of the presence of a micro organism of syphilis, already announced by Aufrecht, which consists of oval-shaped micrococci in chains.

In gonorrhea a micrococcus was discovered by Neisser; isolated, cultivated, and, it is reported, successfully inoculated.

Bacteria have also been found in malaria, and in whooping cough. A micrococcus has also been found associated with croupous pneumonia by Friedlander. This may occur singly, but is generally found as a diplococcus.

Von Recklinghausen first described the bacteria of typhoid fever; and Klebs, in 1881, described a large bacillus, which he calls B. typhosus, in which spores are formed in the centre, and often at the end. This is carried by the blood and lymphatics, and is found in all the organs. It is more generally believed, however, that the *causa morbi* is a peculiar short bacillus discovered by Eberth. This is rounded at both ends, and has spores. It is found in the ulcers, mesenteric glands, and spleen; and has been cultivated by Gaffky. The inoculation of animals has not been successful; but it must be remembered that they do not have the disease spontaneously.

The *Micrococcus Vaccinæ* is very small (only half the thousandth of a millimeter in diameter), and is found isolated or in pairs, and, when cultivated, forms chaplets. Cohn regards *M. Vaccinæ* and *M. Variolæ* as different races

of the same species; but Maguin thinks them identical. In vaccinia they are found in the lymph of the vesicle, and in its borders in the rete Malpighi, and were subsequently traced into the subjacent cutis, especially in the lymphatic spaces. The multiplication and extension coincide with the development of the pustule. In variola, Chauveau (1868) first proved a particulate, non-diffusible, active principle; and Cohn (1872) first proved that the lymph contains numerous micrococci. I have myself cultivated the *M. Vaccinæ* into the third generation, in liquid media, the first inoculation being made directly from the lymph of the vesicles on a calf at Dr. Martin's stables in Roxbury; but limited experiments failed to produce characteristic vesicles on babies vaccinated from these cultures.

The comma bacilli of cholera have of late attracted much attention. They are found chiefly in the excreta of cholera patients, are slightly curved like a comma or the half of the letter U, and occur single, or in pairs like the letter S; when their growth is retarded, they form a spiral chain of several members. They are easily cultivated on nutrient gelatine, forming a growth easily distinguished from others, even from those which are morphologically similar, viz., the so-called cholera nostras, comma bacillus, of Finkler and Prior, the mouth comma of Miller, and the cheese comma of Deneke. After much experimentation, Koch has succeeded in inoculating animals. The bacilli require an alkaline medium for their growth; so he injects, with a catheter, Carbonate of Soda into the stomach of Guinea pigs, to neutralize the acid of the gastric juice. Then he injects a considerable quantity of a solution containing the comma bacilli. Even this is not sufficient, for they pass through the intestines so quickly that they do not proliferate; and therefore he injects into the peritoneal cavity Tincture of Opium, sufficient to paralyze the intestines and stupefy the animal for some time. About half of the animals so treated die in from twelve to twenty-four

hours, and a nearly pure culture of comma bacilli is found in the intestines.

In scarlet fever, Coze and Feltz have found micrococci in the blood, and inoculation of rabbits sometimes produced death; but it is not certain that it was due to scarlatina. Polae Pineas found very minute micrococci on the scales of desquamating epithelium, and in the throat discharge.

In acute infectious osteomyelitis, a peculiar micrococcus is found, which is easily cultivated; and when rabbits are inoculated, and their bones broken, abscesses form, containing micrococci.

In measles, Coze and Feltz found bacteria in the blood, which were minute and mobile. The rabbits were not killed. Braidwood and Vacher caused children with measles to breathe through glass tubes coated with glycerine, and found sparkling bodies, something like those in vaccinia, but larger. These were most abundant during the second and third days. They also found them in the lungs and livers of two children who had died of the disease.

The micrococci of erysipelas are smaller than those of vaccinia. Lukoinsky found them in zooglea masses in the lymphatics, on the border of the erysipelatous zone. Fehleisen also found and cultivated them. He inoculated the ears of nine rabbits, and produced the characteristic rash in from thirty-six to forty-eight hours; the animals did not die. He also produced typical erysipelas, in from fifteen to sixty hours, in men who were inoculated to produce beneficial results in tumors. I have also cultivated them in liquid media.

Septicemia and pyemia have been carefully investigated by Koch; and these diseases have been found due to bacteria, which he has cultivated and inoculated.

In diphtheria, micrococci are found in the membrane and in the surrounding lymphatics, blood, kidneys, and muscles. They are about the size of M. Vacciniæ, slightly oval, single, or in pairs, and in colonies. Eberth showed

the particulate character by filtration. Klebs claims to have produced diphtheria from inoculation of pure cultures, and to have found micrococci in the tissues and blood. Nasiloff inoculated the cornea with enormous multiplication of micro-organisms in the lymphatics of the palate, bones, and cartilages, and says that they are the primary step.

With the diphtheria micrococcus I have had a personal experience. Some membrane was secured from the throat of a child dying with the disease, and with it one of my hermetically sealed culture bulbs (made after Sternberg), filled with a sterilized nutrient fluid, was inoculated. On the fourth day, the liquid, previously clear, became turbid, and on examination with the microscope at about 1000 diameters, it was found swarming with micrococci in active motion, about the size of the micrococcus of pus. In form they were slightly elongated, and, although found singly, were generally in groups of three or four to eight or twelve. A second bulb was inoculated with a fraction of a drop from the first; it became turbid on the third day, and was found to contain a micro-organism identical with the former. In this way about fifty bulbs were used, and it was carried through ten generations, each becoming turbid on the third day, and the micrococci breeding true.

At this stage, six Guinea-pigs were inoculated from the contents of one of the bulbs, in the cornea of the eye. One of them died about thirty hours later, with symptoms of blood poisoning; but the rest survived. The eyes became very sore, the lids being much swollen and œdematous, and a membrane developed over the cornea. There was profuse discharge, which contained abundant micrococci. Three pigs were killed on the third day, and the eyes dissected for examination. The others were allowed to get well, but the eyes were completely destroyed. In the aqueous humor, and in the cornea of the eyes examined, were found minute, highly refractive particles, of uniform size, presumably micrococci. On the third day after killing the Guinea-pigs,

I myself had a sore throat, and in twelve hours a large diphtheritic membrane had developed on the left tonsil, accompanied with high fever and constitutional symptoms. The disease ran a typical course, and convalescence was slow. Here, then, we have the chain of events complete,—a fatal case of diphtheria, from which the germs were cultivated in pure cultures through ten generations, when animals were inoculated, from which the experimenter himself contracted the disease, with development of membrane containing micrococci, which reproduced themselves in cultures.

The question as to the origin of life has been much disputed, and the exponents of spontaneous generation and of the germ theory still continue the contest. Extremists in the doctrine of evolution cannot sustain the hypothesis that the whole system of animal life is but a growth of one or more original species, changing into or evolving others through methods of development. The long ages of the past show the universality of the law of life, that like produces like. Neither the agnostic nor the materialist can account for the origin of matter, much less can they account for the origin of mind. Naturalists tell us that while the animal and vegetable kingdoms are reducible to primordial cells, that while there is a time when the embryos of species cannot be distinguished from each other by any essential features, yet the variety of structural forms, and the diversity of physiological functions, which cells develop, are always according to the special type and construction of their parent cells,—evidencing a unity of plan in their construction and development.

1. The germ theory asserts that no life has been evolved (except in the remotest periods of the earth's history) other than from a living parent or a living germ.

2. The spontaneous generation theory asserts that now, as of old, life does also spring *de novo* from molecular rearrangements of the atoms of dead organic matter.

No authority, except that of experimental work, can

weigh a feather in the balance; no *á priori* reasoning can give the victory to either creed. The one condition is, to take dead matter, isolate it from all contact with life, place it under favorable conditions for development, and watch the result.

The first views founded on experiment and observation, apart from mere philosophical speculation, are those of Needham and Buffon, published in 1748. Needham's theory was, that vitality is produced by a force setting particles in motion, which he calls *force végétatrice.* Needham was opposed by Spallanzani, in 1777, who repeated his experiments by methods so precise as to overthrow the convictions based on Needham's labors. Schultze made an important advance by boiling his infusions and using pure air, and was followed by Schwann, Schrœder, and Von Dusch. In 1859, Pouchet, one of the most ardent supporters of spontaneous generation, published his work. He does not look on these organisms as originating from dead matter, though he believes that it is the contact of different bodies which gives rise to the development of proto-organisms; yet their origin is not due to affinity alone: vital force must also come into play, which owes its power to certain unknown concomitant circumstances. The essentials for the production of the new forms are, a putrescible body, water, and air; while heat, light, and electricity favor the process. His experiments were performed very loosely, and are subject to many errors.

Appearing shortly after Pouchet's work, and leading to diametrically opposite conclusions, were the researches of M. Pasteur, who begins by attempting to demonstrate the existence of spores in the atmosphere. The greatest blow was given to the views of the heterogenists when Pasteur demonstrated that albuminoid materials are not necessary for the development of bacteria and fungi; but that they can be replaced by crystalline salts, such as phosphates and salts of ammonia.

The experiments of Prof. Jeffreys Wyman have been largely quoted by the supporters of heterogenesis as proving their view, though Wyman himself expressed no such opinion, having approached the subject with a perfectly unbiassed mind. To Prof. Wyman is ascribed great credit by Cheyne, whose results agree with his own.

Dr. Bastian (1872) gives up the theory that organic molecules are derived from previously living molecules, and attempts to demonstrate that vital force and living matter may arise *de novo* under the action of the ordinary physical forces,—heat, light, and electricity. This change of front on the part of the heterogenists is clearly brought about by the overwhelming evidence produced against Pouchet's views, and more especially by Pasteur's success in cultivating organisms from dust in fluids containing no organic matter. The limitation of cases of spontaneous generation which has been gradually taking place is very instructive. Beginning with higher animals, it became more limited; frogs, flies, etc., being by degrees excluded, till now it is only in the case of the lowest forms of life that the doctrine is asserted, and even then only in certain cases

Not long since the people of Boston were invited to listen to a series of lectures which continued the discussion of the much disputed question of the origin of life. The lecturer, although announcing himself as a decided opponent of the germ theory, could not agree with the spontaneo-generationists, and offered views somewhat peculiar to himself. His objective point was the so-called "*ambient organic matter*," of which he could give no definition; but, in a long series of illustrations of what he meant, he showed it to be synonymous with the *bioplasm* of Dr. Lionel Beale. The term "bioplasm," as Dr. Beale says, involves no theory as regards the nature or origin of the matter. It simply distinguishes it as *living: e. g.*, a living white blood corpuscle is a mass of bioplasm, or it might have been termed a *bioplast;* a very minute living particle is a bioplast, and we may speak of

living matter as bioplasmic substance. It is bioplasm, or ambient organic matter, according to the new view, that is at the bottom of all the functions of life, it having to a certain extent a low degree of inherent vitality; and the results of the various experiments that have been performed are due to the ambient organic matter, which has never yet been separated, it was urged, from the germs.

It was argued that the germ theorists can prove nothing till they can isolate an organism on a needle-point, and use it for inoculation after thoroughly washing and drying. Floating dust of the air, he added, is not germs, but ambient organic matter. He also expressed a desire to introduce some ambient organic living matter into the infusions, and see what it would do.

Hearing it so strongly urged that we have been mistaken concerning the action and importance of the minute organisms which have made up what they lack in size by the interest they have awakened during the last quarter of a century, it occurred to me that such a theory would be of more value if accompanied by facts based upon actual experiments; but no such experiments were offered to prove the theory, which was allowed to stand by itself. In these days a theory is accepted for what it is worth, and when it relates to science it must be supported by facts. Not considering this theory capable of self-support, and not content to leave the subject in this way, I have still further investigated it.

I am reminded of Prof. Tyndall's experiments with hermetically sealed tubes. One hundred and thirty tubes were used, and, to multiply the chances of spontaneous generation, they were filled with infusions of the most diverse materials (in all numbering twenty-four). Each tube contained an ounce of liquid, and was boiled for three minutes in an oil-bath, and sealed by a spirit-lamp, during ebullition. Two months later, this group of flasks was submitted to the inspection of the Royal Society, and not one of

them was found to contain life. That the infusions were not degraded by boiling was proved by similar exposed tubes which "resolved themselves with the usual speed into bacterial swarms." Special care had been taken that the temperatures to which the flasks were exposed should include those previously alleged to be efficient. The conditions laid down by the heterogenist were accurately copied, but there was no corroboration of his results.

Again, sixty flasks were thus prepared, containing strong infusions of beef, mutton, turnip, and cucumber, carefully packed in sawdust, and carried to the Alps, 7,000 feet above sea-level. Fifty arrived safely, of which twenty-three were opened on a hayloft, and the other twenty-seven 200 feet higher, on a ledge overlooking the Aletsch glacier. The fifty flasks, with necks open, were then placed over the kitchen stove at a temperature of 50° to 90° F. In three days twenty-one of the twenty-three opened on the hayloft were invaded with organisms; but after three weeks' exposure not one of the twenty-seven opened in the free air had become contaminated. No germ from the kitchen air had ascended the narrow necks, the flasks being shaped so as to avoid this contingency.

Sir Joseph Lister's experiments with milk prove a great deal against the view of spontaneous generation. In his attempts to obtain pure unboiled milk, he found that in none of his flasks did he obtain lactic fermentation; but that in all but two (out of some fifty or sixty flasks), organisms of some form or other occurred, these organisms being in many flasks of totally distinct kinds. The fact that no organisms appeared in two flasks, and the great variety developed, prove that they could not have been developed *de novo;* for, all being made under the same conditions, any change occurring in one due to something inherent in the milk, or due to some physical force acting on it, would have occurred equally in all.

We have, then, a great number of experiments made by

distinguished observers, of which I have quoted only a few, which show that life does not commence in substances unless something living exists in or has access to them. No one will deny the existence of the bioplasmic or ambient organic matter; but I must believe that it plays a far different rôle than was ascribed to it by the lecturer, and I also believe that the *germs* exist and play their part.

If we examine fresh blood serum, the aqueous humor of the eye, white of egg, or milk, we will find, with high powers of the microscope (1,000 x), in greater or less quantity, masses of varying size and shape, made up of minute, shining, highly refractive particles, with or without *Brownian* motion, which have a low degree of inherent vitality, and which are bioplasmic or ambient organic matter. No one with any experience is likely to mistake these for the minute, highly refractive bodies, of uniform size, single or in groups, which we recognize as micrococci or bacteria.

These substances, then, containing the ambient organic matter in sufficient quantity, and being free from germs, were selected for testing in the experiments which I made, to see if the extraordinary statements of the lecturer had a basis of fact.

Fresh blood was caught in flasks at the abattoir, as it flowed from the necks of the animals, and was sealed up until the clot had separated. Bulbs similar to those mentioned above, sterilized by heat, were then filled with the serum; and to the culture bulbs, containing sterilized nutrient fluid, serum was added in varying quantity, and the bulbs were hermetically sealed. Milk was carefully drawn from the cow into a flask sterilized by heat, from which culture bulbs were inoculated. Bulbs were also filled and inoculated from the white of an egg still warm from the nest and the aqueous humor of the eyes of freshly killed sheep. The substances introduced into the bulbs were never boiled, because it was argued that the boiling of the infusions is unfair, by rendering them sterilized, barren, and almost inorganic.

These bulbs were kept at a temperature of about 70° F., and examined with the microscope after varying intervals. Of the forty-five bulbs (see tables), forty-four remained perfectly clear and pellucid, and the microscope revealed the same bioplasmic masses as the fresh materials. In only one were there any signs of life, and this was a bulb which had been inoculated with serum, was found to be undergoing fermentation, and was swarming with the germs of putrefaction, bacteria-termo, proving it to have been accidentally contaminated.

In the control experiments, these materials, *exposed to the air*, under the same conditions, gave a far different history, as they rapidly underwent fermentation, and then contained, in addition to the same bioplasmic masses, the germs of putrefaction. Such, then, is the effect of ambient organic matter, *plus* the germs, at a temperature of 70° F. Alone, however, although upon the germinal qualities of it so much has been suggested, not only does it fail to generate life, but it has no power of reproduction, and is at best an organic, nutrient material, serving the highest purpose for bioplasmic use, but having in itself absolutely no independent power of growth.

[NOTE. The classification proposed by Koch since the writing of the paper, has been quite universally accepted. The term *bacteria* is used in the general sense, including both the *micrococci* = the ball-forms, and the *bacilli* = the rod-forms.]

DR. NELSON'S EXPERIMENTS WITH CULTURE BULBS.

No.	Substance Tested.	Day Exam.	Condition of Fluid.	Scum.	Sediment.	Microscopic Appearances.
1	Serum from sheep's blood.	6	Clear.	None.	None.	Same bioplasmic masses as fresh serum.
2	"	6	"	"	"	"
3	"	6	"	"	"	"
4	"	6	"	"	"	"
5	"	11	"	"	"	"
6	"	16	"	"	"	"
7	Bulb inoculated with serum from sheep's blood.	6	"	"	"	"
8	"	6	"	"	"	"
9	"	6	"	"	"	"
10	"	6	"	"	"	"
11	"	6	Slightly turbid.	"	"	" and, in addition, active bacteria termo very abundant.
12	"	9	Clear.	"	"	"
13	"	9	"	"	"	"
14	"	11	"	"	"	"
15	"	16	"	"	"	"
16	"	17	"	"	"	"
17	"	"	"	"	"	"
18	"	"	"	"	"	"
19	"	"	"	"	"	"
20	"	"	"	"	"	"
21	"	"	"	"	"	"
22	"	"	"	"	"	"

DR. NELSON'S EXPERIMENTS WITH CULTURE BULBS.

No.	Substance Tested.	Day Exam.	Condition of fluid.	Scum.	Sediment.	Microscopic Appearances.
23	Bulb inoculated with serum from sheep's blood.	17	Clear.	None.	None.	Same bioplasmic masses as fresh serum.
24	"	8	"	"	"	" (This bulb inoculated from No. 1, at 9th day.)
25	Serum from sheep's blood.	9	"	"	"	"
26	Serum from ox's blood.	6	"	"	"	"
27	"	6	"	"	"	"
28	Bulb inoculated with serum from ox's blood.	6	"	"	"	"
29	"	6	"	"	"	"
30	"	17	"	"	"	"
31	"	17	"	"	"	"
32	Aqueous humor of eye of sheep.	6	"	"	"	"
33	"	6	"	"	"	"
34	Bulb inoculated with aqueous humor of eye of sheep.	6	"	"	"	"
35	"	6	"	"	"	"
36	"	6	"	"	"	"
37	Bulb inoculated with milk.	4	"	"	"	"
38	"	4	"	"	"	"
39	"	4	"	"	"	"
40	"	5	"	"	"	"
41	Albumen—White of egg.	5	"	"	"	"
42	"	5	"	"	"	"
43	Bulbs inoculated with	5	"	"	"	"
44	albumen—white of	5	"	"	"	"
45	egg.	5	"	"	"	"

RESUMÉ OF DR. NELSON'S EXPERIMENTS WITH CULTURE BULBS.

Substance Tested.	Day Exam.	No. of Exp'ts.	Total No.	Microscopic Appearances.
Serum from sheep's blood.	6	4		Same bioplasmic masses as fresh serum.
	9	1		"
	11	1		"
	16	1	7	"
Bulbs inoculated with serum from sheep's blood.	6	5		" and also, in addition, active bacteria termo very abundant.
	9	2		"
	11	1		"
	16	1		"
	17	8		"
	8	1	18	"
Serum from oxen's blood.	6	2	2	"
Inoculated with serum from oxen's blood.	6	2		"
	17	2	4	"
Aqueous humor from eye of sheep.	6	3	2	"
Inoculated with aqueous humor.	6	3	3	"
Inoculated with milk.	4	3		"
	5	1	4	"
Albumen white of egg.	5	2	2	"
Inoculated with albumen.	5	3	3	"
			45	

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DISCUSSION.

Dr. Martin said: I believe that a drop of blood taken from an animal dead with anthrax will cause splenic fever. The same may be true of tuberculosis. But there I stop. The fact that the blood of a man having measles contains bacilli proves nothing at all. Theorists assert that germs induce disease by their introduction and multiplication in the blood,— each special microbe producing its own peculiar disease; but all the work done by cultures and inoculations has not advanced a hair's-breadth towards proving this. Several years ago we heard about an enthusiastic gentleman with a microscope, somewhere in Europe, who was about to propagate vaccine virus by "cultures"; but no more has been heard of this new process. Even Lister's reasoning is purely hypothetical. He would ask if anybody has ever produced erysipelas by introducing bacilli from another case of erysipelas; not a drop of blood, but actual bacilli, and they alone?

Dr. Stevens said that he had recently written a paper on the contagiousness of phthisis. He had met with several cases where husbands and wives seemed to have contracted the disease from each other; but he also generally found evidence of hereditary taint. He believed in separating such patients as much as possible from other members of the family, and also in taking measures to disinfect the sputa.

Dr. Marcy referred to the paper by Formad, delivered in Washington at the meeting of the American Medical Association in May last. Dr. Formad promised to induce tuberculosis without tubercles, but failed. The pulverized glass introduced only resulted in the proliferation of connective tissue. He would emphasize the importance of carefully disinfecting the sputa. In answer to Dr. Martin, he would refer to the disease called beriberi, in which a characteristic bacillus was found by Dr. Lacerda, in the Physiological Laboratory of Brazil. Dr. Marcy had seen four or five cases himself in the Naval Hospital at Brooklyn. The disease is attended with progressive muscular paralysis; and the patients die or recover after a sickness of many months. The bacillus was cultivated, and it reproduced the disease, which is ordinarily found only in rice-eating regions.

On the rice is found a nest, which contains a peculiar micro-organism. This having been cultivated, and animals inoculated therefrom, a disease was produced, in the subjects of which were detected bacilli identical with those found in the original affection.

FARADISM IN THE PRACTICE OF GYNECOLOGY.

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Read March 14, 1889.

In these days of brilliant theories and magnificent possibilities much is said in regard to the value of the galvanic current in the treatment of certain diseases of women; and the results which have been achieved by Apostoli and his followers are far in advance of anything that a generation ago the most enthusiastic advocates had even hoped for. The elaboration of this system of electro-therapeutics has been accomplished only by the expenditure of a vast deal of time and thought. Instruments and appliances the most ingenious have been devised to meet the various phases and indications of what may be termed a normal departure, suggesting the adoption of remedial measures. The work in this field has many attractions, and is capable of satisfying the longings of natures the most ambitious, and of yielding a feeling of complacency that can only be rivalled or reached by the eclat that is sure to follow successful cases of laparotomy and ovariotomy. Indeed the term electro-therapeutics of late has become almost identical with that of galvanism. The development of such special appliances has led to further inquiries in regard to the treatment of certain gynecological cases by the application of the Faradic current. It is to be noted that the results obtained by the employment of this form of electricity give promise of the attainment of results which without the employment of this current could not be secured.

Apostoli's method of treatment of chronic metritis and endo-metritis comprises an intra-uterine chemical galvano-cauterization, to be carried out in a strictly antiseptic manner. The sittings, though short, must be frequent, if they are to be successful. The application of this method necessitates the use of special rooms and conveniences, which only a few persons are likely to have. Any departure from the prescribed plan is certain to be attended with much danger. When we consider the necessity of so frequent sittings before we can even hope for success, we are forced to conclude that this plan of treatment will never become very popular. Operators who have special conveniences will always prefer treatment by laparotomy, or other surgical methods, in which the lives of patients, in most instances, are only jeopardized but once, than incur repeated risks by the method of chemical galvano-cauterization. In the employment of the Faradic current we act upon the superficial blood-vessels, we modify the nutrition of the parts, we hasten absorption of extraneous matter. Now, all this can be done without incurring the extreme hazard which usually accompanies methods by galvanization. The Faradic current has a markedly sedative effect upon the parts, and, when the currents are judiciously applied, the patient often feels a sense of relief, and will return for further help. Even in cases in which marked inflammatory processes are present, the Faradic current may be resorted to with much benefit. In a paper presented to the Association of Obstetricians and Gynecologists, Washington, D. C., in 1888, I reported several cases of salpingitis, in which the treatment, supplemented by Faradization, was productive of much benefit. Cases also in which the abdominal walls were soft, and unusually relaxed, or in which there was undue distention induced by various lesions, were greatly relieved by the employment of the Faradic current.

The following cases are appended to show the more favorable results of the treatment: —

Case I. Mrs. K., aged thirty-eight years, mother of one child thirteen years old, notified me last July that she expected to be confined in September following. I saw the patient July 21st, and, after a careful examination, found that she was not pregnant. Her menses had appeared at irregular intervals, but the distention of the abdomen was so great that she supposed herself pregnant, and had made all necessary preparations for confinement. The bowels were regular; she had a fair appetite, and the urine appeared normal. There was some pain and tenderness over each ovary. The circumference of the abdomen was greater than normal, and the patient fancied that she felt fœtal movements. The uterus was soft, relaxed, and anteverted; but not to such a degree as to cause vesical disturbance. I began with the use of the Faradic current, with slow interruptions, over the abdomen, and to the cervix, while over the ovaries on the outside frequent interruptions of the current were employed. Occasionally an intra-uterine electrode was employed, while the other pole (usually the negative) was connected with the wire brush. The patient quickly improved under this treatment, the abdominal distention subsided, and the pain in the ovaries disappeared. The sittings were continued at intervals of three days; each occupying from five to ten minutes. They covered a period from August 14 to November 17, 1888. Since then she has been in good health.

Case II. Mrs. O., mother of three children. The oldest is twelve years, the youngest four years of age. This patient had been an invalid for several years. There was an old perineal laceration, though no prolapse had occurred, nor any vesical disturbance. The cervix was thickened and indurated. There was no leucorrhœa, nor any history of an acute inflammation. The patient had worn several kinds of pessaries, but said she had never experienced any special benefit from them. The principal trouble complained of, when she came under my care, was pain in the back and

left ovarian region, and, at irregular intervals, attacks of severe pain in the head, attended with symptoms which indicated that hysteria was an important element in the disease. As this patient had been under the usual routine treatment of several good practitioners, I advised discontinuance of pessaries, etc., and began the application of the Faradic current. This method was commenced in the early part of August, and was continued at intervals of three and four times a week, each application of the current lasting eight minutes. Over the more painful points the current with frequent interruptions was used. Along the muscles of the back and areas of great sensitiveness, the current with slower interruptions was selected. The negative pole with an intra-uterine electrode was applied. After the third application of the current, the patient showed signs of improvement. Faradization in this way was persevered in regularly for two months. After that the seances were continued at longer intervals. The treatment was supplemented with an aloetic purge, and followed by the daily use of gentle aperients. The patient, though not fully restored to health, so far recovered as to be able to attend to her domestic affairs, to go out doors, and to enjoy many of the comforts of life. It is probable that, eventually, an operation for restoration of the perineum will have to be performed.

Case III. Mrs. S., aged twenty-six years, married five years, miscarried after the third month of pregnancy. The placenta was retained upwards of sixty days. When I was called, there was flowing and a fœtid discharge. I succeeded in effecting an entire removal of the placenta. The patient after that rapidly improved, but was anæmic, and the tissues were soft and relaxed. After a period of four months, the patient returned to me, complaining of vesical disturbance. Vaginal examination showed that the uterus was retroflexed, and that there was a well-defined cystocele. The uterus was restored; the patient was directed to urinate at short intervals, and to avoid if possible the occurrence of

over-distention of the bladder. After the lapse of six months, there being still considerable vesical disturbance, Faradization was begun. Slow interruptions of the current were employed in the cul-de-sac on each side of the cervix, and over the abdomen. The sittings were held every third day for four weeks, and then at intervals of once a week. After the second month, the patient considered herself as cured. A recent examination shows that after a lapse of six months the cystocele has not returned, and the retroflection is but slight. She is now entirely well.

Case IV. Mrs. B., aged thirty-eight years, mother of two children, the youngest of whom is fifteen years of age. After her last confinement, she suffered very much from catarrhal endocervicitis, but the menses appeared regularly. Vaginal examination showed that there had been a multiple laceration of the cervix, but cicatrization was complete. The cervical canal was preternaturally sensitive. The perineum had been lacerated, but Nature had partially restored the rent. The uterus was retroverted. When the patient came under my treatment eight months ago, her principal trouble was pain in the ovaries. These could be distinctly felt, and were not displaced. Pain also was complained of in the back, from the lower dorsal vertebræ to the coccyx. The tendon reflex was markedly increased. The patient suffered from frequent attacks of what she called "blinding headache." The urine was heavily loaded with urates. Under ether, I thoroughly curetted the cervical canal. After being restored to its normal position, the uterus was kept in place by vaginal tampons. Butcher's meat was interdicted; the bowels were kept open by gentle aperients. The patient improved under this treatment. After the lapse of three months, slow interruptions of the Faradic current were tried every third day for five weeks; and for the next four weeks once in every four days; subsequently once in two weeks. This treatment occupied upward of four months, and its good effects were shown by

the disappearance of the increased tendon reflex and the return of strength and appetite. All pain and tenderness vanished, and the local lesions now give no trouble.

Case V. Mrs. S., aged thirty-eight years, mother of one child four years old. The patient recovered well from confinement, and was in good health until January, 1888, when she sustained injuries from being thrown out of a carriage. She suffered much at the time, and was confined to her bed. Severe pain existed in the lower part of her back and in the bladder. Micturition was more or less painful. No uterine displacement occurred; but a sharp pain in the right ovary was complained of. After two months of rest and treatment, the pain disappeared, except that in the ovary. The ovary of that side was probably affected by the shock attendant on the accident. In March, Faradism was tried. The positive pole was applied over the abdomen, and also in the right inguinal region and in the right cul-de-sac. The other pole was applied along the lumbar and sacral portions of the spine. The wire brush on the outside was also used. The patient showed improvement after the third seance. The sittings were continued at intervals of two and three days until the middle of April. Since then no further trouble has been experienced from the ovaritis, and the parts have resumed their normal functions.

Case VI. Mrs. A., aged forty-one years, mother of three children, the youngest of whom is nine years old. For the past five years the patient has had several attacks of rheumatism, necessitating confinement to bed during each attack. When I was first called, she was recovering from one of these attacks, which had continued from September 10th to October 24th. There was some swelling of both knee and ankle joints; but the greatest amount of suffering appeared to be centred in the pelvic organs, especially in the uterus and its adnexa. Mineral waters and saline laxatives were first employed. The use of meats and nitrogenous food was forbidden; milk and light articles of diet were

prescribed. The patient rapidly improved, and in November was free from the rheumatic affection, except weakness and discomfort in her back, and in the genito-urinary organs. The patient was still unable to walk without the aid of a cane or crutches. Uterine dyskinesia existed, though no marked flexion of that organ could be made out. There was a sensible diminution of the tendon reflex, and almost an entire absence of the ankle clonus. Faradization was begun at this time, and was continued until December 12th, every second day; when the pain vanished, and she was able to walk without help. The reflexes had returned to their normal condition.

Case VII. Miss L., aged twenty-two years, while walking on a country road, in January, 1888, fell over an embankment. Uterine hemorrhage occurred at the time of the accident. The patient complained bitterly of pain in the right side and back. She was under treatment for six weeks, at the end of which time she had so far recovered as to be able to return to her home. The patient came under my care in the following May. Vaginal examination showed that there was a marked anteflexion. Vesical disturbance existed, and considerable difficulty was experienced in walking or in attempting to make any considerable exertion. A Hodge pessary gave only partial relief, but was worn until August, when I removed it permanently, and began with the Faradic current with slow interruptions. Each sitting lasted ten minutes, and was repeated every third or fourth day. After the sixth application the uterine tissue appeared firmer, and, on being restored, the womb retained its position much longer than before. The treatment was persevered in until October, when the patient regarded herself as cured. Uterine flexion existed in a minor degree only.

In reviewing the histories and symptoms of these cases we find inflammation, attended with more or less pain, and some form of neurosis, was a prominent feature, and that the application of the Faradic current was productive of

much benefit. In case I. the current with slow interruptions had the effect of stimulating the relaxed muscular tissues, and of giving tone and vigor to the parts.

In case II. the pain and reflex symptoms were relieved, and the health improved; and, should an operation for restoration of the perineum be deemed advisable, the patient will be in much better condition to undergo it.

Case III. shows the beneficial effects of the current with slow interruptions. A cystocele, induced by overdistention of the bladder, in a subject of weakened and relaxed muscular tissue, was cured by prolonged applications of the current.

Case IV. shows the benefit derived from the same current in controlling tendon reflex and nervous excitability.

Case V. illustrates the therapeutical advantage of Faradism when the wire brush is used in the treatment of inflammation following after shock and concussion of the ovary.

Case VI. proves the help to be derived from continued application of the Faradic current in restoring reflexes to the normal condition and in exciting healthy action in the genito-urinary organs.

Case VII., in some respects like case III., exemplifies the tonic effect obtained by the employment of the same current on relaxed uterine tissue.

I am in possession of the notes of some thirty other gynecological cases, in which Faradization was resorted to with favorable results. In twelve of these cases, the application was made to remove pain, and allay nervous disturbance arising from various lesions requiring operative interference; viz., six for pyo-salpinx and salpingitis, four for lacerations of the perineum and cervix, one for uterine polypus, and one for urethral vascular growth. In nine cases it was used to remove pain and to quiet nervous phenomena arising from functional disturbances; viz., three for subinvolution, four for leucorrhœal and gonorrhœal pain,

one for neuralgia of the ovary, and one for menorrhagia. In two the application was made on account of amenorrhœa; in four for cystitis, and in three for hysteria and loss of power in arm and leg. These cases I report, not with the view of establishing a claim for originality, or for the purpose of decrying other well-tried methods, but in recognition of the fact that we have in this form of electricity, for certain cases, an agent capable of yielding most gratifying results.

ERGOT IN OBSTETRICS.

BY CHARLES W. STEVENS, M.D.,

OF CHARLESTOWN, MASS.

Read June 16, 1887.

On recently turning to the article "Ergot," in Maisch and Stillé's last Dispensatory, I was confronted with five rules for the use of Ergot in obstetrics, which I wish briefly to discuss.

The preparations of this drug now almost exclusively used are the Fluid Extract and Ergotine. For hypodermic purposes, I wish to recommend Tanret's Ergotinine, a genuine alkaloid, the advantages of which are that it does not cause local abscesses nor swellings, is rapid in action, and not painful nor depressing. The dose is only five to ten drops. I used it once in metrorrhagia with immediate good effect, and once in vesical hematuria, with the same success, after failure of the ordinary remedies. I desire, likewise, to call attention to an old, unofficinal tincture, which has become obsolete: I refer to the Ammoniated Tincture of Ergot.

Ergot owes its power to its action on the nervous system, by means of the vaso-motor centres. Its effect on the heart is to slow its contractions and weaken its action; in other words, it has a toxic and paralyzing effect. The same result is produced on the fœtus, whose pulse becomes slower and irregular. Now the antidotes for ergotism are Belladonna and Ammonia, both of which stimulate the cardiac and respiratory centres. In cases, therefore, in which there is prostration, weak heart, and prolonged labor, I believe the Ammoniated Tincture of Ergot indicated, and very beneficial.

The action of Ergot on the impregnated uterus seems to be limited to the circular and oblique fibres, with no effect on the longitudinal fibres. Hence this drug never dilates the cervix, but produces only prolonged tetanic contractions of an irregular excursion. The results are often injurious to the mother, by causing rupture of the bladder, uterus, or perineum, and imprisonment of the placenta; they are also injurious to the child by direct pressure of the hardened uterine walls on the head and placental vessels, entailing stoppage of fœtal circulation and apoplexy.

In support of these views I will cite a few corroborations. Dr. Hardy, of Dublin Lying-in-Hospital, observes: "As the result of repeated observations, I have remarked a marked diminution, in pregnancy, of the pulsations in the mother, soon succeeded by an irregularity in its beat, and on the fœtal pulse still more remarkable though similar changes took place; and where the pulse has been reduced to below 110, the child is rarely, if ever, saved. Of forty-five cases in which it was used, thirty-five were still-born."

Dr. Davis, of London, reports ten cases in which Ergot was used, with four deaths. Dr. Patterson, of Edinburgh, used it in eight cases, with three deaths. Dr. Chatard, of Baltimore, cites thirty-six cases, with twelve deaths.

Dr. Ward writes: "I am led to conclude that, in most cases after giving it, unless the child is expelled in forty minutes, it will be born dead."

Dr. Stearns, who in this country first called attention to the use of Ergot in obstetrics, had so much mortality in the children born that he was obliged to leave Albany.

Dr. Lusk says: "Of Ergot and forceps, the advantage of safety and celerity are all on the side of forceps. The only imperative exhibition of Ergot is presented by the occurrence of post-partum hemorrhage, resulting from uterine atony."

Dr. Hodge: "Forceps in all cases where inertia exists, and the child presents either the vertex or face, is far more

efficient and safe than any oxytocic remedy, and I have employed it for many years instead of any other oxytocic."

Dr. Elliot: "In those cases of delayed labor in which forceps can readily be used, and the choice lies between them and Ergot, my personal preference would be for the forceps."

Lombe Athill: "Ergot is absolutely given up in the Rotunda Hospital; I may say, prohibited."

Playfair: "Ergot should be chiefly used for the purpose of exciting uterine contraction after delivery; and should rarely, if at all, be employed before the birth of the child."

What substitutes have we for ante-partum use? For inertia, I strongly recommend quinine, as suggested by Dr. Monteverdi, of Italy. I have given it with excellent effect Its full action did not seem to appear before an hour after its exhibition; but my friend Dr. Gunter tells me that he has injected ten grains into the thigh, when the pains were nearly extinct and the patient exhausted, with powerful effect in a short time. I have given fifteen grains of the Bisulphate of Quinia with great satisfaction. I place great reliance on digital dilatation of the os, with friction over the abdomen at the same time. By reflex action the uterus contracts more strongly and regularly, and, as Paul Mundé says: "Friction is more prompt than Ergot." I consider this manipulation of the os superior to the use of belladonna ointment; and, if friction fail, we have a powerful aid in Kristeller's expression of the fœtus. I have also found an opiate an excellent oxytocic. In my early experience I gave it to give rest to the tired patient, but found that it generally increased the frequency and force of the pains. Of late I have been trying the effect of inhalations of chloroform and alcohol,—one part chloroform to five parts alcohol. With this mixture, inhaled only during the pains, I get a stimulant effect, which not only strengthens the contractions, but also calms the patient.

I am now prepared to discuss Dr. Stillé's five indications, which I will take up *seriatim*.

First rule: "Ergot is to be given in lingering labors when the child is low, the parts relaxed, the pains absent or feeble, and there is danger from hemorrhage, or other alarming symptom."

Barnes says: "In ante-partum hemorrhage, Ergot is not very useful. If there is great depression, the drug is either not absorbed, and is therefore inert; or, if absorbed, it is injurious by adding to the prostration. The first thing to be done is to rupture the membranes, and, when there is sufficient dilatation, you may deliver by the forceps if the head present, or by bi-polar turning if any other part present." That, in my opinion, is the correct treatment; only I should change the phrase "When there is sufficient dilatation" to the injunction: If the os be not dilated, use Barnes' dilators, and then deliver by the forceps. The dilators make an admirable plug. But Lusk reasons more cogently when he observes: "When Ergot is given, as is commonly done at the time of the passage of the child's head, it is liable to produce its effect prematurely, and thus give rise to hour-glass contraction. The rarity of the accident is no argument in favor of the popularity of the practice, in face of the serious complications to which it is capable of giving rise." In another place he mentions Ergot in relation to ante-partum hemorrhage, but adds: "In another case I should certainly first dilate, and, after rupture of the membranes, should choose version." In passing I wish to mention the method of my friend Dr. Nunn, of Savannah, who, in cases of placenta prævia, applied Persulphate of Iron directly to the bleeding surface, and was successful. This, then, is my position in regard to ante-partum hemorrhage: No Ergot, notwithstanding its recommendation by such high authorities as Leishman, Madden, Playfair, Schrœder, Robert Lee, Goodell, Cazeaux, Hodge, and Verrier.

Stillé's second rule: "When the pains are suspended, and convulsions set in, venesection being premised."

This rule is obscure, inasmuch as the stage of labor is

not mentioned. Venesection is excellent; but Ergot would be a very injudicious remedy. If the os is closed, and pains are present, it should be artificially dilated, and then forceps if the head present, or version, if any other part, should be employed. Ether and Chloral Hydrate I have found very useful. And I have likewise found hypodermic injections of morphia efficacious in some cases. Verrier is the only author I know of who recommends Ergot. He gives it, and then applies the forceps. Robert Lee, Lusk, Scanzoni, Leishman, Playfair, Cazeaux, and Elliot all enjoin venesection, and then, after dilatation, use the forceps. Playfair and Lusk recommend chloral in addition. Scanzoni and Lusk also favor morphine.

Third rule: "In an inevitable abortion." If the os is dilated, extraction by the fingers, followed by Ergot, is undoubtedly the best procedure. If it is impossible to reach the ovum or placenta, then placental forceps or a wire curette will, in nearly every case, succeed. If the os is closed, then an opiate with belladonna is indicated, and the os may be dilated artificially, or a vaginal tampon will act by reflex action, and cause dilatation. Scanzoni and Lusk are, I think, alone in the belief that Ergot will dilate a closed os. They say, Give large doses, which will dilate the os. In opposition to this view, Dr. J. W. Saunders says: "I claim, and can establish by the testimony of at least fifty cases, that when threatened abortion is evidenced by pain and hemorrhage, Ergot in full doses is the safest and most certain remedy known to the profession to check hemorrhage and retain the fœtus *in situ*, with safety to mother and child." In the same trend, Dr. O. A. Battson remarks, that, in abortion with closed os and moderate hemorrhage, Ergot and morphia are nearly sure to stop the abortion. It follows, therefore, that with closed os, Ergot, in the early months, acts chiefly as a hemostatic, and with open os, in inevitable abortion, the uterine contents should first be removed, and then Ergot will bring on contraction.

Fourth rule: "When the placenta is retained by uterine inertia." Ergot is always liable to bring on hour-glass contraction, and hence imprison the placenta, and, consequently, is contra-indicated. By Credé's method, the secundines are usually expelled; if not, peeling off the placenta by the hand is the next best procedure. My friend, Dr. Furbush, on one occasion of retention of the placenta, had the fortunate thought of putting the nozzle of a syringe inside the cut end of the navel cord, and injecting some hot water; by which means the uterus became relaxed, and the placenta was immediately expelled. Scanzoni is the only author who favors Ergot for this purpose. Even Robert Lee says, "If the placenta does not come away by gentle friction within an hour, I would not advise you to give Ergot, but to put the cord upon the stretch, and introduce your hand into the uterus."

Fifth rule: "Post-partum hemorrhage." Here Ergot finds its legitimate field; but even then it cannot be wholly depended upon, or, as Playfair says: "We cannot, however, look upon Ergot as anything but a useful accessary." In friction on the inner surface of the uterus and over the abdomen, in hot water irrigation within the uterus, or ice, and in painting the inner surface with Churchill's Tincture of Iodine, or vinegar, we have efficient agents for inducing firm contraction. If hemorrhage takes place immediately after the birth of the child, it is better to deliver the after-birth before giving Ergot, as it may be locked up, in whole or in part. Dr. Garrigues mentions a case of hemorrhage of this kind in which he gave Secale, and he found it very difficult to dilate the os internum enough to get a single finger through, in order to remove a small piece of placenta which kept up the hemorrhage.

THE PERINEUM:

Its Anatomy, Physiology, and Methods of Restoration after Injury.

BY HENRY O. MARCY, A.M., M.D., LL.D.,

OF BOSTON, MASS.

Read Oct. 11, 1888.

It may occur to some present that I have exhausted, so far as my ability, the subject announced upon the programme. I have called the attention of the profession, upon several occasions, to the injuries of the perineum and the methods which appeared to me best suited to its repair. The importance of the subject, and the differences of opinion yet held by many of the leading authorities, both in Europe and America, seem sufficient to make the theme one of marked interest to the profession at the present time, and especially fitting to occupy the attention of this Society, whose members are devoted alike to those branches of the profession which include the causes of the injury, as well as the means best adapted for restoration. I review my own publications upon the subject with more than ordinary satisfaction, since they may be considered as progressive phases in the study of a problem which has occupied more than an ordinary share of my attention for a number of years, and to what I now offer in addition, although perhaps not conclusive or final, I invite your consideration and earnest criticism.

All good surgery must be based upon a thorough knowledge of anatomy; and while this is essentially true in the consideration of every operative measure, as, for example, the resection of a bone or the ligation of a vessel, it is

especially to be emphasized where the avowed object of the operator is the restoration of the injured parts to their former normal condition. This is the problem confronting the obstetric or gynesic surgeon when he undertakes to deal with lesions of the pelvic floor.

The surgical anatomy of the male perineum may be said to have been practically demonstrated, and the subject long since exhausted. It is a *sine qua non* to the graduation of every medical student, and properly so, because of the importance of such knowledge in the practice of every-day life; but if this is necessary to the proper consideration of diseases of the male, how much greater the need of a familiar and accurate understanding of the pelvic organs, their relationship and supports, in the female! Here, in addition to the lower segment of the alimentary canal and its outlet, the position and retention of the bladder with its efferent passage, are placed the complex organs of reproduction, which necessitate a third and largest of the openings through the pelvic floor. Not alone should this give additional interest and importance to the careful study of the female pelvis and its contents when in the exercise of the ordinary functions of life, but especially when we take into consideration the physiological changes occurring during pregnancy and parturition, — conditions so important, which occupy so large a share of the attention of the profession, and demand from its members often the exercise of the highest skill and ability. If, happily, the recovery from parturition renders danger to life no longer imminent, yet every practitioner listens to the almost daily complaint of suffering dependent upon injury of the parts involved, and the reflexive nervous disturbances resulting therefrom.

To those whom I am now addressing, it may seem almost superfluous to make reference to these complaints, since the cases are so very common where injuries to the vulvar outlet have caused years of semi-invalidism, overlooked by the superficial observer. This happened, since there was

no visible prolapse, and the proof of the correctness of causation is found in the fact that a permanent cure follows the restoration of the parts.

The description of the anatomical structure of the pelvic floor, in most of the text-books, appears to me faulty; and, on this account, much confusion occurs, not only in the use of names applied to certain parts, but especially in involving the whole subject in unnecessary complexity.

The comparison between the component structures of the male and female pelvis shows a closer analogy than is at first apparent. The levator ani in the male is inseparably blended with the sphincter ani. (Plate I., Fig. I.) The transversus perinei in a central tendinous line joins with the levatores and sphincter in front of the anus, and anteriorly, between this point and the accelerator urinæ and erector penis, there exists an irregular space, floored by the deep perineal fasciæ, called the triangular ligament of the urethra. This corresponds to the vaginal opening in the female. The accelerator urinæ or ejaculator muscle, separated in the median raphé, is not very unlike the sphincter vaginal muscle. The erector penis and erector clitoridis are similar in position and functions. The transversi perinei are placed more obliquely in the male than in the female, and are often less well developed.

Since the dissections of William Hunter, undertaken to demonstrate the anatomy and physiological function of the reproductive organs during pregnancy, the most valuable contribution to the proper understanding of the anatomy of the pelvic structures in the female is that of Dr. Henry Savage, of London. These studies, supplemented by the important teachings derived from frozen sections, greatly modify the previous views of the physiological relationship of the pelvic organs.

The depth of the perineum is less than usually described. The axis of the anus cuts that of the vagina at nearly right angles, and leaves in the external angle an irregular flat-

tened portion of tissue, rarely, when examined upon the living subject, more than half an inch in thickness. In the nulliparous woman, this is clearly defined as a firm portion of the pelvic floor, and is composed of skin, fat, elastic and connective tissue, transverse muscles, sustaining fasciæ, and the anterior portion of the sphincter ani.

PLATE I.

Fig. 1.

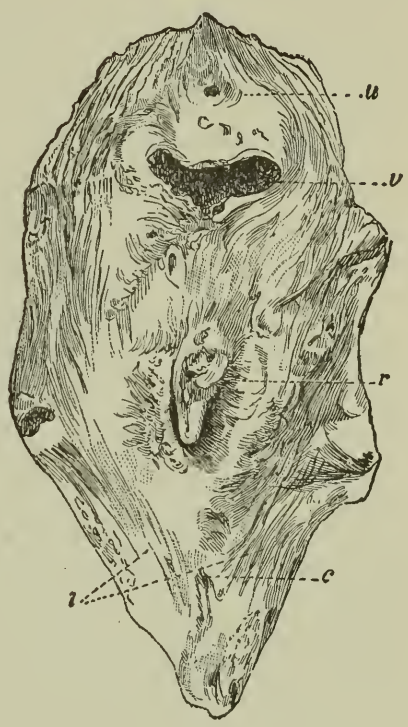


Fig. 2.

Fig. 1.—The perineal fascia removed, showing the transversi perinei muscles. They are seen to unite in a firm, central, tendinous raphé. Posteriorly are seen the mucous folds of the anus. (From photograph of a dissection for illustration of this paper).

Fig. 2.—*u*. Urethra. *v*. Vagina. *r*. Rectum. *c*. Coccyx. *l*. Levator ani. The fibres may be traced descending from above the urethra, and uniting at coccyx to form a complete loop. The section is made just posterior to the transversus perinei. The perineal space between rectum and vagina is observed to be of considerable depth. (From photograph of a dissection made for illustration).

The vaginal side is usually slightly concave, and the rectal side convex, owing to the interblending of the

sphincter ani. If the finger be carried just within the perineum proper, and a little to either side, there can be felt the firm encircling band of the levator pubo-coccygeus, attached to each rami of the pubes above, and descending to join with the posterior fibres of the sphincter ani and coccyx. In the perineum posteriorly this is firmly interblended upon either side with the transverse perineal muscles. These are under the control of volition, in considerable degree, and, acting conjointly, serve to draw the vagina forward on to the pubes. (Plate I., Fig. 2.)

The parturient and fecal canals are supported in the pelvic basin in close apposition; and the functional relationship is often such that the one may encroach upon the other in a way so as to occupy nearly all the space accorded to both. This is especially true in parturition, when the rectal space is reduced to a thin folded tube; and often, in elderly women, the rectum becomes saccated, pushing forward the posterior vaginal wall, forming a considerable external tumor. The pelvic floor is so formed and blended about these openings that it not only properly supports these tubes, but also materially aids them in their physiological function. In intimate relation to both are the bladder and uterus in their ever-varying functional activity, and each is surrounded by a delicate plexus of nerves and vessels.

The sacral prominence throws a large proportion of the abdominal weight upon the symphysis pubis and the recti muscles, in the support of the body, and thus relieves the pelvic basin and takes off undue strain upon the pelvic floor. The rectum is rarely entirely empty, is circular in shape, serves the digestive apparatus, in a measure, as a constantly receiving reservoir, and, when not distended, may be felt from the vagina as a tube curving posteriorly. It is suspended and supported — slung, so to speak — by the levator ani muscles, which hold the vagina in their encircling loop. On the contrary, the vagina, entirely unlike the

earlier diagrams, is flattened antero-posteriorly upon itself, and in health its walls are, when at rest, ever in close apposition. The vagina joins with the vulva at right angles to its opening, at the entrance of its passage through the pelvic floor. The vulvar organs are all intimately blended with, and go to form a part of, the perineum proper. On each side of the vaginal orifice are the erector clitoridis, the bulbo-cavernosus, and the transversus perinei muscles; and these, with the levator ani, make up, in large measure, the pelvic floor. The bulbi vaginæ and Bartholinian glands are covered by these muscles with their erectile plexus of vessels, and an abundant distribution of lymphatics and nerves.

The erector clitoridis and bulbo-cavernosus muscles, with the transversus perinei, join on each side to constitute the ovate muscular vaginal orifice, and, in their conjoined action, perform a very important physiological function in sexual congress, often underestimated or ignored. Their impaired function frequently underlies certain reflex nervous conditions, distinctly pathological, which are easily overlooked, but which are the cause of much suffering and unhappiness.

The much discussed, so-called perineal body has, in my opinion, misled some of our prominent authors into false positions, and caused great confusion and misunderstanding among physicians.

I have been criticised, in emphasizing the muscular floor of the pelvis, that I underestimate the importance of the variously distributed connective tissue and fascia. This is not by any means my intention. The superficial perineal fascia, in its deep layer in the male, as well as in the female, covers and encloses the transversus perinei muscles, forming strong ligamentous transverse bands, uniting in the perineum, designated by Savage as ischio-perineal ligaments. (Plate I.; Plate II., Figs 1 and 2.)

The pubo-coccygei, acting in unison with the other muscles of the pelvic floor, draw forward, and thus aid not only in closing the rectum, but hold both it and the vagina in the

anterior curve, so important to be retained for the preservation of normal function. (Plate II., Fig. 1.)

PLATE II.

Fig. 1.

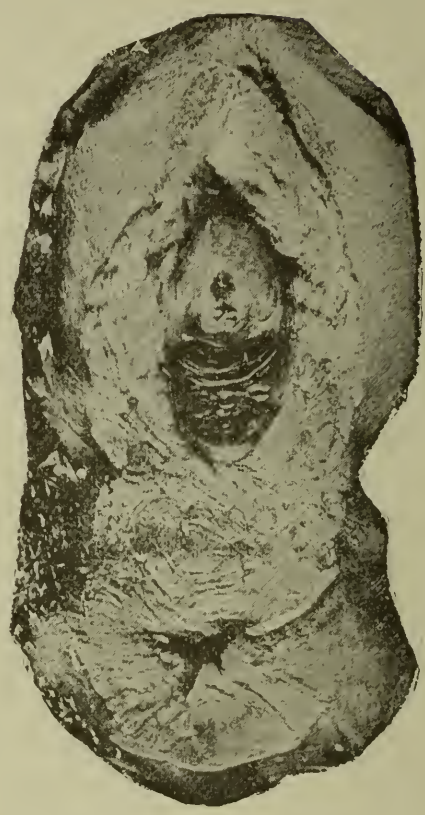


Fig. 2.

Fig. 1.—From photograph of dissections of the superficial fascia, made for illustration of this paper. The vaginal fascia blends behind the clitoris. Over the transversus perinei it unites with the fascia encircling the anal folds.

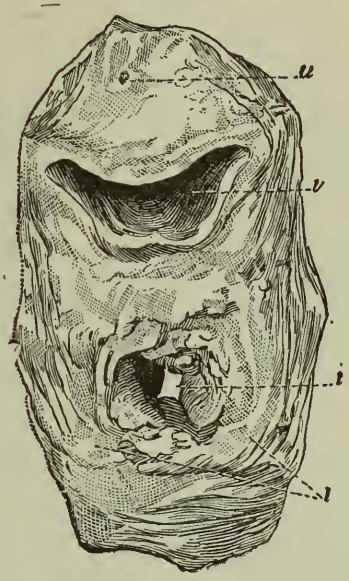
Fig. 2.—The deep layer of the superficial fascia intimately connected with the transversus perinei.

A horizontal section, made through the floor, just above the sphincter vaginæ and posterior to the junction of the transversus perinei, shows the deeper fibres of the pubococcygeus, united in a loop, behind the lower border of the rectum, holding it from the fixed point at the pubes, as in a sling. This loop is connected with the transversus perinei, bulbo-cavernosus, erector clitoridis, sphincter vaginæ, and sphincter ani muscles by strong layers of connective tissue,

the importance of which, for union and support, cannot be readily overestimated. (Plate I., Fig. 2.)

Upon the posterior wall of the vagina, in its lower third, longitudinal muscular fibres are found external to the circular layer, and these intimately blend with the pubo-coccygeus, giving a firm support to the vaginal outlet, quite as the outer longitudinal fibres of the rectum unite with the deep layers of the sphincter ani. The physiological action

PLATE III.



u. Urethra. *v.* Vagina. *r.* Rectum. *l.* Fibres of levator ani. The section is made at greater depth than Fig. 2, Plate II., about one-half inch posterior to the junction of the transversi. The fibres of the levator loop are well marked. (From photograph of a dissection for illustration.)

of the muscles thus grouped serve to draw the rectum forward toward the pubic arch, and approximate it in close relation to the urethra; and this explains, in large degree, why the circular fibres of the vagina, left free to act in other directions, are intra-folded laterally, making in cross-section an imperfect figure H, first pointed out by Freund, in 1873. This intra-folding of the vagina, at right angles to the axis of the vulvar outlet, is very important in its relationship of support to the uterus and its appendages. (Plate III.)

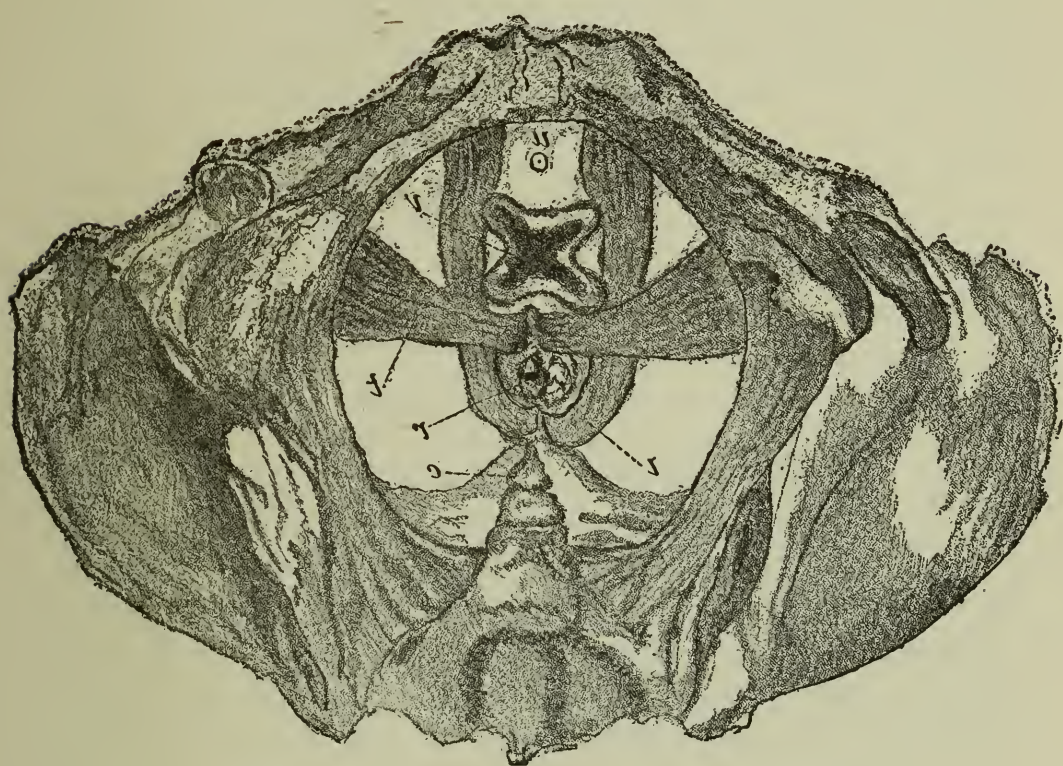
One of America's most distinguished gynecologists takes exception to the possibility of the perineum and vagina serving as a uterine support, and says that "it would be as rational to assume that a man's pantaloons were supported by the legs resting on the instep or foot." When we remember that the promontory of the sacrum is so placed in its relation to the pelvic basin that the superincumbent abdominal weight is thereby deflected upon the symphysis pubis and the recti muscles, we better understand the protection given, in a normal condition, to the organs of the pelvis, and their comparative state of rest, independent of the position of the body.

The vaginal axis is normally about parallel to the conjugate of the brim. The anal axis is nearly at right angles with the vagina, and on a line with that of the uterus. The urethra, vagina, and rectum are disposed in curves corresponding to the sacral line. Architecturally considered, these are the lines and disposition of supports adapted to require the least outlay of power in order to retain the organs in position. This is more to be emphasized since the physiological function demands mobility of the organs, in conjunction, and also each independent of the other. Viewed from this standpoint, a still further analysis of the vagina, as a column of elastic support to the uterus, is of interest and importance. (Plate IV.)

We have already observed that the circular loop of muscular fibres of the pubo-coccygeus posterior to the anus, carries the rectum forward on to the vagina, and changes the vertical vulvar outlet into an antero-posterior closure of the vaginal canal, and that this again is thrown into two lateral folds. The longitudinal muscular fibres, external to the vaginal muscle, and which extend, both in front and behind the vagina, along the distal third, are the chief cause in producing this intra-folding, constituting in large part the so-called columnæ rugarum. The letter-H shape thus given to the vaginal column in section is well known in the

arts as the form adapted for the resistance of vertical weight. This elastic column, retained in its shape and position by its basic vulvar and perineal support, in its upper border is blended with the cervical tissues. The union thus made with the uterus is at nearly right angles to the vagina, and serves to hold the lower segment of the uterus backward, retaining that organ, like a ship at anchor,

PLATE IV.



The outlet of the pelvis with its ligamentous attachments, showing the relations of the levator loop and transversi perinei muscles (diagrammatic). *u.* Urethra. *v.* Vagina. *r.* Rectum. *c.* Coccyx. *l.* Levators. *t.* Transversi perinei.

swung on its lateral supports, with freedom of mobility at its moorings. This vaginal support to the uterus is so effective, in the normal condition, that the cervix uteri is rarely displaced without there first ensues a change in the

vagina. Although there are exceptions, of which the scope of this paper will not permit the discussion, the general consensus of medical opinion is that the changes which occur in the vagina usually commence with lesions of the outlet and contiguous tissues, dependent upon parturition.

A weakness in the base of support, the change of muscular action which causes a drawing upward and backward of the posterior vaginal wall, with an eversion of the vulvar outlet, produce a change in the axis of the vagina, bringing it and the uterus toward a common plane; and then the cervix, instead of being held at right angles, becomes a wedge in line with the vaginal outlet, separating its walls. This change in the position of the uterus causes the weight of the abdominal contents, deflected towards the pubis, no longer to fall upon the organ posteriorly but vertically, and little by little, following the sacral curve in its descent, prolapsus, with varying degrees of retroversion, ensues.

The injuries of the retro-vaginal pelvic fascia, occasionally occurring in delivery, have been somewhat recently deservedly emphasized by Freund, Emmet, Baldy, Hadra, and others. The latter author considers that many of the ill results following delivery are due to injuries of the vaginal fornix and the upper portion of the parturient canal, and are consequently often overlooked.* "The impacted head, in its further progress, tears loose the upper portion of the anterior vaginal wall from the bladder and from the anterior surface of the cervix, turning it into a loose pouch, which the bladder will have to follow on account of gravity." This, he believes, is the more common cause of cystocele. Hadra has devised certain plastic operations (resections of the upper portion of the vaginal canal) to remedy these injuries.

In a similar manner, the vagina posteriorly is caught in a fold, and protrudes as a ring before the advancing head,

* Hadra: The Medical Register, vol. i., p. 611.

and, in the eversion thus produced, it has been assumed rather than demonstrated that the posterior folds of the pelvic fascia are sundered, and that the result of the injury may be prolapse, with rectocele and deep lateral sulci. Such injuries very probably occur, and enter into the sum total of possible damage; but to differentiate and emphasize them as independent of the various muscles which it is their office to hold in proper relation and support, or to base important surgical operations upon their assumed restoration, is misleading and unscientific. In a sense, muscle and fascia are equally important, since the one fails in its function without the support of the other.

If the anatomy and physiology of the pelvic floor have been correctly described and interpreted, there takes place, in normal parturition, a retraction or drawing upward of the bladder before the descending head, rendered possible by its loose, suspensory ligament, until the occiput passes below, and is allowed to escape anteriorly to the symphysis. The perineal muscles relax, and descend in a more or less encircling loop, the pressure upon which is not lessened until the occiput escapes. This is not the place to enlarge upon the physiology of parturition; but the above view, especially emphasized by Drs. Simpson and Hart, is important in its practical bearing upon the so-called support of the perineum in delivery, wrongly taught in many of the standard textbooks. I believe injuries to the perineum are often caused by the earnest but misdirected efforts of the accoucheur in the desire to preserve the tissues intact.

I have carefully reviewed our present knowledge of the anatomy and physiology of the pelvic floor, since all attempts at a restoration must in a large measure depend upon our understanding what we mean to restore. It should be taught as cardinal that the obstetrician has not completed his duty to his patient until he has carefully examined, in a good light, the vaginal outlet. There is still considerable difference of opinion whether an attempt at immediate repair is

advisable. This has been questioned, since the bruised and raggedly torn tissues seem unsuited for primary union, and the lochial discharges are liable to infect the wound.

Antiseptic midwifery, however, has abundantly demonstrated the error of such conclusions. When the parts are maintained aseptic, the union rarely fails, and, if by any reason this should not take place, the patient is rendered none the less fitted for subsequent operation. The torn tissues are very vascular, extraordinarily developed in preparation for the parturient act, and paralyzed, in a measure, by the extreme tension to which they have been subjected. All this favors a rapid plastic repair. There can be little doubt that the time is not far distant when the patient will rightfully demand of the practitioner as rigid care in this respect as in any other part of her supervision.

The primary operation is comparatively simple, and often will not require an anesthetic. A solution of cocaine is frequently of service. Under irrigation with sublimate solution, the vaginal vault lightly tamponed to retain the uterine flow, with one or two fingers in the rectum, unite the parts with a deep continuous buried tendon suture. The torn muscles are not retracted, and lie easily in apposition. The deep sutures are limited to the perineum, and should be so placed as to be covered by the superficial vaginal line of union; they should be four or five in number, taken with the double continuous stitch hereafter described. Since 1886, I have modified the operation by commencing at the upper angle of the wound, and closing the vaginal mucous membrane with a tendon suture applied as a blind stitch. This is best effected by a straight Hagedorn needle, lightly but accurately piercing the connective tissue, beneath the mucous membrane, from side to side. The sewing is continuous in the same way over the fourchette posteriorly to the limit of the division of the skin. Thus the divided edges are brought evenly into apposition without the vestige of a stitch in sight. The parts, carefully dried, are dusted

with iodoform, and covered with iodoform collodion. The tampon is replaced by a light packing of iodoform wool, and, if the operation is done aseptically, the repair goes on as in a subcutaneous wound.

If the rupture extends into the rectum, the lower bowel having been well washed with sublimate, care being exercised not to allow its retention, and tamponed with iodoform wool, the rectal mucous membrane is closed with great care, the stitches being taking continuously as above described. The sewing is carried to the anal opening, and the suture left uncut. When drawn sufficiently tense, it becomes a buried suture, and the rectal mucous membrane lies in close apposition. The operation is then continued as in incomplete rupture, the deep double suture (the Marcy stitch) also carefully enclosing the divided sphincter. When the edges of the two anterior sides of the triangle have been coapted by the buried suture, the end is joined to the rectal suture in front of the anus. Although I have usually retained the united parts at rest, without strain, for some days, by the means of a lateral support, as a sort of splint, with parallel pins applied in halves and joined like a safety-pin * (previously elsewhere described), in a number of instances, I have omitted this support, and complete union followed without pain or even œdema of the parts.

The operation is to be commended for its simplicity in application, the comfort of the patient, as well as assurance of result. A word of caution may be required that the sutures are not drawn too taut, since retention in easy apposition is to be sought, and constriction of tissue avoided, as even in an aseptic wound injury must otherwise result.

Operations undertaken for the restoration of the perineum, a considerable period having elapsed since the injury, are quite different from primary operations. Here, almost always, certain secondary changes of adjacent organs have

* American Medical Association Journal, October 27, 1883.

supervened, and on this account the patient seeks the aid of the surgeon. Thus new and often difficult factors enter into the problem, and these generally vary to such a degree that each case must be carefully studied as a personal equation.

Perineal lacerations usually commence at the posterior commissure, and may extend even through the recto-vaginal septum. They vary in all degrees, but for convenience are divided usually into incomplete and complete ruptures, the latter including an opening into the rectum involving the sphincter ani. Lack of symmetry is usual, and results from a lateral deflection of the rupture, the posterior columna rugarum usually remaining as a much thickened projection, often overlapping the side of the lesion.

The pelvic floor, viewed from within, presents a series of inclined planes sloping toward the anus, the general function of which, beside furnishing a strong elastic support, is best described by the name given to the larger group of muscles by the earlier anatomists (levatores ani).

There is a large class of injuries to the pelvic floor, incident to childbirth, usually overlooked or underestimated, because the external orifice shows no material damage. These concealed injuries are due frequently to a submucous tear of the transversi, a rending of the pubo-coccygeus from its posterior perineal attachment, and may be continuous through the vagina, up the lateral sulci, leaving the columna rugarum free upon one or both sides. (Plate IV.) It is exceptional that the injury is symmetrical, usually extending higher upon one side than the other, and may even reach into the posterior fornix. These inside lacerations usually begin from above, before the advancing head, and generally do not involve the rectal tube, since this is merely compressed laterally, and comes into tension by the strain upon its anterior and lateral attachments, which are the site of actual injury. On the contrary, lacerations of the sphincter are usually produced by the overtension on the median line

posteriorly, causing a rupture in the raphé, which extends backward into the rectum. (Plate V.)

PLATE V.

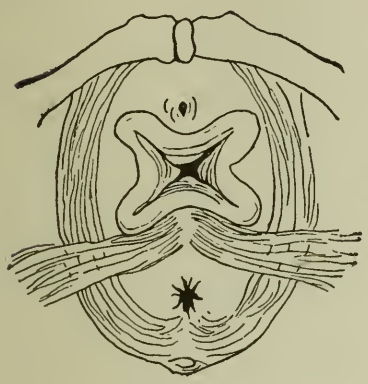


FIG. 1.

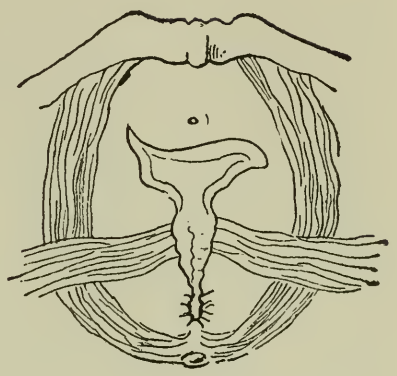


FIG. 2.

FIG. 1.—Diagram showing the relation of the uninjured muscular attachments of the levator and transversus.

FIG. 2.—Showing a central lesion, the transversi slightly separated, the levator loop weakened in its support, causing a relaxation of the posterior wall of the vagina. If complete, loss of septum.

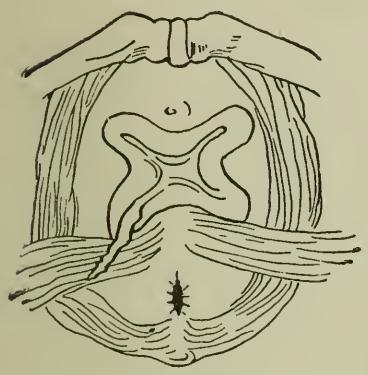


FIG. 3.

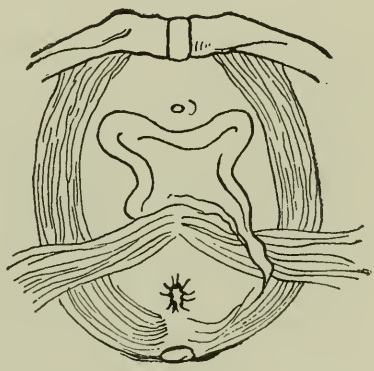


FIG. 4.

Figs. 3 and 4 showing lateral rents separating the transversi, with more or less injury to the levator loop.

There is a series of severe injuries where the vagina shows no evidence of lesion, and, although these are generally ascribed to overstrain or distension at labor, followed by relaxation and weakening of support, a deep post-vaginal injury to the muscular groups can usually be demonstrated.

The finger no longer feels the firm ridge of the transversi muscles closing the vulva posteriorly. The pubo-coccygeus is felt as a large, open loop, passing obliquely backward into the pelvis, changing, in a marked degree, the plane of the pelvic floor. A careful study of the differences between these and the normal conditions renders this injury readily recognizable. A perineum may seem to be deep, because of the loose, relaxed condition of the parts, but the transversi uninjured are tense, and therefore may appear shallow. When the upper portions of the levator loop are uninjured, they may, in a measure, retain the pelvic organs in position, but, by the increased strain and tension, produce much suffering. Often, on this account, operative measures may be required.

In deeper ruptures, accompanied by rectocele, the posterior vaginal wall, on the contrary, is much thinned, and the mucous rugæ disappear. Carefully examined, cicatrices usually extend much beyond the ununited parts, showing that a limited repair took place after the injury. Often bridges of cicatricial tissue make an imperfect repair of what, otherwise, would be a complete rupture; the radiating folds of the anus are retained only posteriorly. The rectal mucous membrane everts anteriorly in a thick, soft fold, sometimes appearing as a small tumor. When the injury is severe, the transverse muscles of the perineum are separated at their union in the median line, and, contracting towards their origin, draw apart the injured surfaces, and the levator loop no longer presses the rectum forward upon the vagina, but, loosened from its central support, is changed in its plane of action, and causes eversion of the posterior portion of the vagina. (Plate V., Fig. 2.)

A careful review of the surgical proceedings adapted to repair the injuries of the pelvic floor leads us beyond the limits of this occasion, but forms a chapter of exceptional interest. The time involved, the thought expended, the ingenuity and fertility of resource to meet and group the

different factors, as they appear to the varying consideration of special students, generally writers of much eminence in the surgical domain, all teach the importance and difficulty of the problem.

Celsus clearly recognized the injuries incident to parturition, advised rest in bed and tying of the legs, but gave no suggestion of surgical repair.

Ambrose Paré pointed out the applicability of sutures, and his pupil Guillemeau restored the parts, applied the interrupted suture, followed by cure. At the close of the last century, Saucerotte and Noël each succeeded in a single case, using the twisted suture.

Dieffenbach, surgeon to the Charity Hospital in Berlin, in 1829, gave much attention to the injuries incident to labor, and his method of repair finds recognition in the text-books of to-day.* "After a most deliberate and careful investigation, Dieffenbach concluded that suture alone would not supply any certain mode of remedying perineal laceration; and, among others, he laid down the following rules of practice: 1. That prior to the operation the bowels should be well cleared by purgatives and enemata. 2. That, despite the swollen state of the torn parts, the presence of discharges, and the debility of the patient after delivery, the operation should be performed as immediately as possible after the accident, since those evils would be more than counterbalanced by those consequent on delay, as suppuration, sloughing, and loss of substance, and the yet later results, displacement of the uterus and associated organs. 3. That no rupture, however slight, should be left to nature, for the healing would be superficial, and the vulva enlarged, proportionately to the extent of laceration, by the retraction of the labia toward the anus, the support of the pelvic viscera being also thereby diminished. 4. That three to five sutures are necessary, according to the severity of the accident; the

* Baker Brown: Diseases of Women, 1st edition, 1854, p. 13.

insertion of the sutures commencing at the anus, and, where the sphincter is torn, the first being applied at its angle. 5. That where the perineum is lax, either the twisted or the interrupted suture may be used, and, when the vagina is implicated, its fissure should be first brought together; also that where the perineum is tense and rigid, an elliptic incision should be made on either side the median line, and equidistant from it. 6. That in those cases where there has been a considerable loss of substance, the transplantation of an adjoining piece of integument may be resorted to, *i. e.*, a plastic operation may be attempted. 7. That in cases of old standing the edges of the fissure require to be pared before being brought into apposition by sutures. 8. That after the operation the bowels should be bound by the administration of opium, in doses of one-third of a grain twice a day, and that the urine should be regularly withdrawn by the catheter." Lateral incision to relieve tension, and confining the bowels by opium, are the most noteworthy of his directions.

Chelius, on the contrary, advocated keeping the bowels loose during the process of repair. This seems to have been the common practice until Baker Brown revived, in this respect, the teaching of Dieffenbach. The next most important contribution that has come to my notice is that of Langenbeck, described in a memoir published in 1852, by M. Verhaeghe, of Ostend:

"Operation* immediately after the accident is advocated; but the description given of the proceeding applies to old cases, 'since in recent lacerations it is only necessary to bring into apposition the divided tissues to restore the perineum.' The operation may be divided into several stages, viz.: 1. Vivisection of the free border or spur (éperon) of the recto-vaginal septum. 2. The undoubling (dédoublement) of the septum, and the formation of a flap destined to

* Baker Brown: Diseases of Women, 1854, pp. 23, 24.

form, in the new perineum, the anterior side of the triangular space formed by the two canals, vagina and rectum, with the perineum as the base. 3. The vivisection of the two lips of the laceration. 4. The insertion of the sutures. 5. The two semilunar incisions advised by Dieffenbach. In order to pare the free edge of the septum, two fingers of the left hand are introduced into the rectum so as to stretch the parts transversely; then, by means of scissors, a very thin lamina is removed from the entire thickness of the spur. This done, the two fingers in the rectum keeping up tension of the septum, a nearly semicircular incision is made on the anterior surface of the latter, and two or three lines from its inferior border. The upper lip of this incision is next to be seized by forceps, and separated by careful dissection from the deep layer for the space in length of six lines, and in the entire breadth of the septum. Thus two laminæ are formed, one anterior or vaginal, the other posterior or rectal; the latter destined to continue *in situ* to close the rectum, the former to be drawn forward and fixed by its angles at the anterior part of the new perineum on each side. It will thus form an inclined plane, directed from behind forward, as a sort of valve, which will act with reference to the new perineum as the epiglottis does to the glottis, that is to say, it will prevent the fluids of the vagina coming in contact with the newly united parts.

"The vivisection of the two sides of the laceration is the next object. To do this, a quadrilateral space, rather elongated antero-posteriorly, is to be circumscribed by the scalpel, from the vulva towards the anus, avoiding the mucous membrane of the vagina above and the skin below. In front the incision must not pass beyond, nor yet stop short of the point where the posterior commissure of the vulva naturally exists; behind it should connect itself with the corresponding side of the pared edges of the spur; no portion not pared should exist between them. In general, this quadrilateral space should be an inch and a half long, by three-quarters of an inch wide.

"This space having been accurately pared, and bleeding having ceased, the next business is the introduction of the sutures. The suture intended to close the rectum is the first introduced, by a curved needle carrying a double thread. The needle should pierce the skin to the left of the anterior margin of the anus, and from four to five lines from the edge of the wound, so that it may come out on the denuded border of the spur of the septum, at the distance of about two lines to the left of the central line; it is then to be plunged into the same border, at an equal distance from the median line, and to be brought out at a point corresponding to that at which it was first inserted on the opposite side. By drawing this thread, the opposite pared edges are found to approach in the median line and thus to close the rectum. This ligature thus drawn, being entrusted to an assistant, the other sutures are to be introduced. The posterior suture is the first inserted, and about four lines should be left between any two. The needle should penetrate the flesh from four to six lines from the margin of the wound, and emerge at a corresponding point on the opposite side, being kept clear from wounding the mucous membrane of the vagina.

"The next step is to fix the lamina derived from the septum. For this object small curved needles with a single thread suffice. This flap being fixed, its purpose becomes evident. It acts as a vaulted roof to the essential parts of the operation, obliging all the original secretions to flow towards the vulva, without infiltrating in the interstices of the united fissure. In other words, it reconstitutes the anterior wall of the triangular space seen in the normal perineum. The sutures of the perineum are now drawn tight. Lastly, the incisions of Dieffenbach may be made, as they serve materially to obviate dragging on the united parts by movements."

I have made a transcript of this method in detail, since there are two features in the dissection and apposition usually attributed to more recent surgeons. In previous

publications upon this subject, I have given credit to Dr. Jenks, of Detroit, as the originator of the method of flap dissection which I used in my earlier operations; the purpose, I supposed, having been that of Langenbeck's operation, viz., to protect the wound from the vaginal secretions. It will be seen by quotations later from Dr. Jenks' own article, that he does not claim this as a part of his method, since he removes the flap entire after dissection. The other feature to be emphasized is the lateral splitting of the edges of the parts to be coapted, "undoubling." This method is attributed by Drs. Hart and Barbour * to Prof. A. R. Simpson, by Zweifel † to Lawson Tait, and which I published in 1883 as a device of my own, unaware of its use previously.

Baker Brown published his method in 1854, advocating the dissection of Dieffenbach, the use of deep quilled sutures, and the bilateral division of the sphincter ani. This latter measure he thinks of the first importance in severe cases. The diet is kept very light, the knees close together, the urine drawn by catheter, opium is used freely, the deep sutures removed usually about the fourth day. In the further development of the operation, Simon's modification of Dieffenbach's comes into consideration. He carried the denudation up the vaginal vault, posterior colporrhaphy, over the region of the perineal cicatrix, in the shape of a triangle. This was first closed, and then the operation continued as by Dieffenbach. In complete rupture, he applied sutures in three directions, crossing in the perineal space. The perineal sutures were removed the third day; the vaginal and rectal later, often remaining ten or twelve days. All the sutures used were of silk.

Little by little, in modification of the above method, the dissections were extended more and more up, and laterally into the posterior folds of the vagina, notably by Hilde-

* Manual of Gynecology, Hart and Barbour, p. 517.
† Cyclopedia of Obstetrics and Gynecology, vol. xii.

brandt and Hegar. Kaltenbach and Hegar adopted in complete rupture the closure by stitches taken in the three directions from the perineal centre as the point of departure, the vaginal sutures being the deep ones, the others superficial. Kaltenbach carried the denudation even into the vaginal cul-de-sac.

One of the most important contributions to the surgery of the early part of this generation is conceded as American, and due, in large measure, to her favorite son, sometimes called the Founder of Gynecology, Marion Sims. Mettauer, of Virginia, first used and commended metallic sutures (lead) in 1830. Iron and silver wire followed, and came into general use for many purposes after the demonstration of the cure of vesico-vaginal fistula. In the Woman's Hospital in New York, Sims, Emmet, and Thomas, with able assistants, many of whom have since become famous, worked out the problem of their adaptation to the plastic repair of the vaginal tract. The great value of the wire suture was found in its non-irritating qualities. This, in wounds usually septic, was a great advance. They could remain for a much longer period; but, in an aseptic wound, they offer no advantage over silk or other material, and are often troublesome to remove.

To Dr. Emmet is due the introduction of the method which is the one most generally practised in America. The two points most important that he presents are the denudation, and the introduction of the first stitch (wire) through the sphincter ani. He states: "If we examine carefully an old, complete laceration, upon each side there there will be found a little depression or pit, which I attribute to the contraction of a portion of the sphincter ani." This marks its point of laceration, and should be very carefully refreshed. In contraction, the fibres are so separated that, in the way too often sutured, the inner constricting bands are not closed, and thus retract with, at best, a weak union. The stitch should be deep enough to include all

the fibres. This is an important point, and should be always kept in mind. In perineo-plasty for rectocele, as well as restoration of the perineum proper, Dr. Emmet modifies the dissection of the mucous membrane so as to include the deep lateral sulci. These are united in an irregular V-shape. In 1883, Dr. Emmet published his new operation for so-called laceration of the perineum. Since I have elsewhere criticised* this operation, I extract from the articles of Drs. Jenks and Coe.† Dr. Jenks writes: "In this paper, he [Dr. Emmet] holds that the loss of support following the laceration produced by child-birth is not due to the injury of the perineal body. In fact, he denies the existence of any such body, and claims that the injury is due rather to the detachment of perineal muscles and the perineal fascia. The description of this operation by the author is by no means lucid, but it substantially consists in a semilunar form of denudation, wholly within the vagina, of such extent that when the edges are brought together by means of sutures, the 'slack' in the posterior wall is entirely taken up, or made to disappear, and yet the ostium vaginæ is in no way denuded or directly interfered with. The advantages claimed are, great diminution in the discomfort following immediately after the operation, and the perfect juxtaposition of the anterior and posterior vaginal walls, as as in the non-parous woman."

Dr. Coe ‡ states, "Although Dr. Emmet was not the first to affirm the insignificance of the perineal body as a support, he has deduced the practical lesson that laceration of the perineum alone impairs but little the integrity of the uterine support, whereas, overstretching or tearing of the fascia or muscles (levatores ani) of the floor at their attachment to the vagina, as the result of parturition, at once disturbs the delicate adjustment of the pelvic organs. This

* "The Physician and Surgeon," May, 1887.

† "American System of Gynecology," vol. i., p. 55.

‡ "American System of Gynecology," vol. i., p. 234.

theory, so correct logically, has unfortunately not yet received confirmation through careful dissections. Assuming that the injury in such cases involves the deeper tissues, and that it is not impaired by closing the perineum alone, it remains to inquire if the new operation proposed by Dr. Emmet does fulfil the indications. Granting that the tissues of the pelvic floor are lacerated, does the operator reunite the torn ends by passing his sutures blindly through the posterior vaginal wall, or is the operation simply a modified posterior colporrhaphy, the ultimate result of which is simply to narrow the vagina by the removal of redundant tissue?"

Dr. Dudley also seems to appreciate that Dr. Emmet may fail in the closure of the deeper layers of the sundered structures, and has added several deep perineal sutures, after the method of Simon.

Dr. Wylie has modified Dr. Emmet's operation.* "Commencing from below, a strip of mucous membrane as wide as can be conveniently cut is snipped off, following the line of junction of the skin and mucous membrane from the level of the inferior caruncle on one side to the same level on the other. We then denude all the posterior surface of the vagina up to this level, till we reach the beginning of the sulci running on either side of the rectocele. The part of the operation requiring the greatest judgment has now come. Our object is to unite the vaginal walls above the sulcus on one side with the corresponding portion of the vaginal wall on the other side, so obliterating the sulci, and forcing back the rectocele. If we carry denudation too high, we shall find it difficult to bring the two sides together without undue tension. If we are too timid, our support will be insufficient, and the operation will be but a partial success. The proper level having been determined, we continue the denudation upward till we reach the points

* The Medical Register, vol. ii., p. 196.

in the vagina which we marked out as the limits of tension from the apex of the rectocele. This will usually be about one and a half inches from the orifice. In denuding this portion of the vagina we still work from side to side, carrying the strip of mucous membrane down into the sulcus, and up to the level we have marked on the other side. In doing this we should not cut very deeply, and preserve as much as possible of the muscular substance of the wall of the vagina over the rectocele; but afterward we should go over the work in the sulci, removing all tissue till we come to the fibrous external sheaths of the vagina. In this way we hope to preserve a firm muscular coat over the rectocele. When we are through, the denuded surface will be nearly square, or, if the rectocele be very large, a parallelogram, the greatest length being transverse to the axis of the vagina. All bleeding should be controlled perfectly by pressure and torsion; but, if necessary, catgut ligatures may be used, and the parts washed thoroughly with some efficient antiseptic."

This method of posterior colporrhaphy is important chiefly in that Dr. Wylie cuts away, by a second paring of the parts, laterally the vaginal muscle. He also emphasizes the stretching of the sphincter ani, in order to relieve tension and discomfort from rectal distention. He uses the interrupted suture, tightening from below upward, being careful that the needle is buried when it passes under the angle of the sulcus.

In Germany, the first notice I find of the use of *animal sutures* in perineorrhaphy is by Bröse, in recent lacerations, in 1883.* He commended catgut treated with a corrosive sublimate solution and preserved in absolute alcohol, rejecting that prepared after Lister's method.† Schroeder used, in perineorrhaphy, with much satisfaction, catgut soaked eight days in a 1 to 1000 sublimate solution, and then pre-

* Centralblatt für Gynakologie, 1883.
† Centralblatt für Gynakologie, 15 July, 1885.

served in juniper oil. Doléris* published his experience, and advised knotting the thread from time to time. He states, "The catgut is absorbed in seven or eight days." Last year, when here at the International Medical Congress, he informed me that his experience continued satisfactory.

Dr. Martin, of Berlin, reported † twelve cases in which he used the continued catgut sature with good results. Since this time he has continued its use. When the wound surface is very large he coapts in layers, as did Schroeder, and thus buries one line of the sutures. He commends this practice as very satisfactory. He refers to Werth as having published, in 1879, the advocacy of the use of catgut as a deep sature. Dr. Martin's method of denudation is a modification of Freund's operation. Both leave the columna rugarum, and resect in a lateral direction, as thought sufficient to restore the normal vaginal lumen.

Bischoff's method is interesting, in that he revives the flap operation of Langenbeck, but reattaches it laterally. He, like Langenbeck, limits the dissection to the removal of the mucous membrane. Lawson Tait, also, in complete ruptures, has recently modified the Langenbeck operation. He removes no tissue, and operates with scissors. His sutures are inserted in the axis of the wound, and surround and bring together large surfaces. The suture should not appear in the rectum, and only the knot should show in the vagina. Two stitches, of silk, are always sufficient, and generally are removed the tenth or twelfth day.

Heppner devised a suture for securing equable pressure. It is a figure of 8 in shape, and possesses certain advantages. Hadra, of Texas, has recently contributed a series of interesting articles ‡ upon the lesions and restoration of the pelvic floor. After a careful review of the operative measures commended by various authors, he criticizes most of

* Archives de Toxicologie, Fev., 1885.

† Deutsche Med. Wochenschrift, No. 2, 1886.

‡ Medical Register, 1887.

the methods as in certain respects defective. First, that operations for posterior colporrhaphy are made upon the denuded vaginal muscle, and are not resections of the vagina, as in anterior colporrhaphy, now generally recommended. His query is pertinent, since if, for the anterior portion of the vaginal tract, resection is best, why not for the posterior? Again, he places much emphasis upon the vaginal vault or fornix, and he has devised some ingenious resections as modified posterior colporrhaphies.

Although this review is necessarily brief and imperfect, many excellent suggestions and changes in operative procedures by distinguished men having been omitted, I have endeavored to sketch the outlines of thought which lead up to the present accepted modes of surgical repair. We have seen, with one or two exceptions, that the tissue removed is limited to the mucous membrane, whether the operation is upon the perineum proper or a posterior colporrhaphy. In operations for incomplete rupture, more or less complicated with rectocele and prolapse, the method with the exception of Wylie's, consists of an intrafolding of the muscular wall of the vagina, in varying pattern.

The groupings of the muscles sundered at the perineal raphé, and more or less widely separated, are, in attempt, included by deep sutures taken in every manner of direction, while every material used in surgery for sutures finds its advocates.

In the earlier part of this paper, I endeavored to show the anatomical relation of the parts, when normal, the more exact conditions of the structures as usually found after injury, and their perverted physiological action, producing various degrees of suffering. It was demonstrated that the changes in the vaginal structures were generally not due to a primary injury of this muscle or its mucous covering, but to the secondary forces brought to bear upon it called into action by the modified relations of the muscles of the pelvic floor; the transversi perinei no longer supporting and hold-

ing in place the other groups, but, on the contrary, retracting towards their origin, and thus everting the vulvar opening ; the levatores ani, not able to act as a suspensory band, pulling forward and closing the vaginal canal, but, on the contrary, freed from their central moorings, drawing the anus upward and backward. These, of course, are accompanied by changes in vascularity and innervation, by weakening of the various layers of the pelvic fascia, by absorption of the fat and elastic tissues, by defective action of the bulbo-cavernosus erector clitoridis, and sphincter vaginæ muscles, by consequent imperfect circulation in the erectile tissues, and perverted glandular secretion. The ultimate effects are a bladder weakened in support, a distorted rectum, a displaced uterus, each factor adding to the other, until the sum total of discomfort renders life often a grievous burden.

In June, 1883, at a meeting of the American Medical Association, I read a paper upon the restoration of the perineum by a new method, which was published in the Journal of the Association the following October. In this I advocated the dissection of the portion to be restored by a flap, the lower border of which only is separated. This dissection I made after the manner of Dr. Jenks, with two modifications, which seemed to me essential; first, making the dissection as deep as possible, without its being retro-vaginal, and then retaining it *entire*, instead of dissecting it away, as recommended by Dr. Jenks. He says, * "I use neither tenaculum nor tissue-forceps, but, with the parts tense, snip a hole in the mucous membrane in the median line, close to the integument, and then inserting the scissors with a cutting motion into the small hole made, I continue to dissect the mucous membrane away from adjacent tissues without removing the scissors, first going up the septum as far as desired, and then laterally, first on one side and then

* American Journal of Obstetrics, 1879.

PLATE VI.

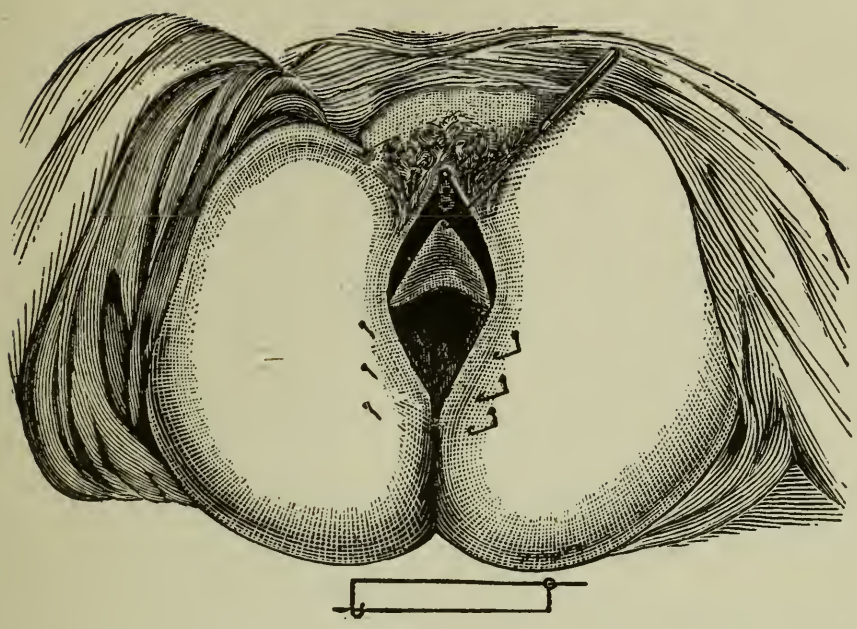


FIG. 1.

FIG. 1.—Represents the separation and uplifting of the posterior vaginal wall. The pins are already inserted, ready for coaptation and fixation by clamping.

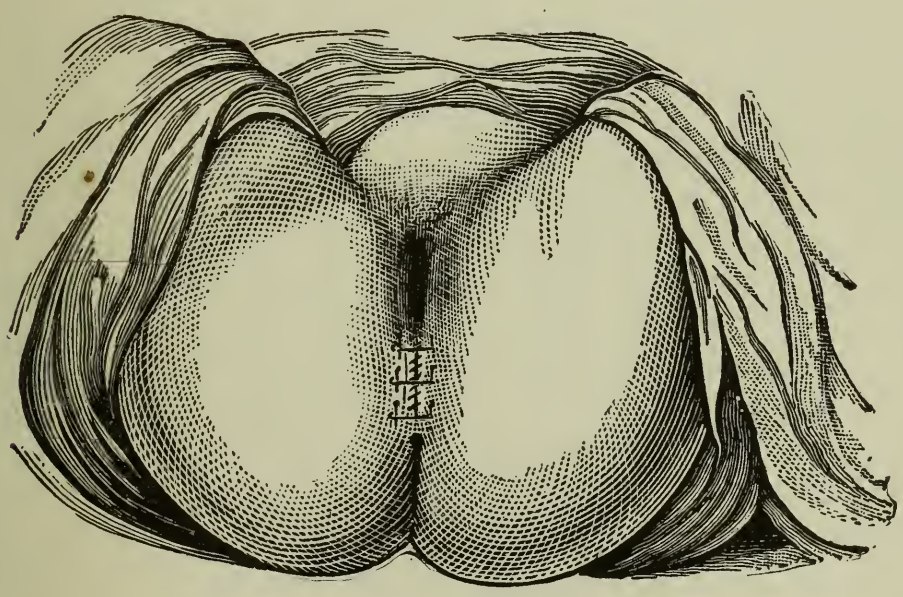


FIG. 2.

FIG. 2 shows the operation completed, and the careful adjustment of the edges by a fine continuous animal suture.

on the other, without removing the scissors or once bringing their points from beneath the mucous membrane. Then, with blunt-pointed scissors, I cut away the dissected flap."

This anterior flap I utilized by coapting its inverted Λ-shaped, freshened surface, and united the lower sides of the triangle, the perineum proper, by lateral supporting pins* (Plate VI., Fig. 1). "This is effected by means of a double pin, the halves of which are nearly alike. The pin is made of German-silver wire, gauge No. 20 or 22, since this material does not irritate the tissues, and possesses stiffness and elasticity, qualities which are essential. The end is bent in a small loop, and turned one-fourth of an inch therefrom at a right angle, and the shaft is two to two and a half inches in length, sharpened like the point of the needle of a subcutaneous syringe. The one-half is introduced from the vagina, *within* outward, quite deep into the connective tissue laterally, the direction being determined by the finger placed in the rectum, to which the pin should be parallel. The other half of the pin, similarly constructed, is introduced from *without* inward upon the opposite side in the same manner, the point of which is caught in the loop of the first part, and adjusted without. Thus a kind of 'safety pin' is constructed, and, when fitted to retain properly the enclosed portions, the loops are clamped down by compression forceps and the ends cut square. This is found to hold sufficiently firm; but at first, upon fearing it might not be secure, I also clamped a perforated shot upon the wire. The shot renders the end of the pin less liable to cause irritation. If properly adjusted, the elasticity of the wire compensates for the collateral edema, and does not impair the circulation in the inclosed parts, while complete approximation is obtained, and no force is exercised in the direction of the long axis of the triangle. Two to four pins are required, as the case may demand (Plate VI., Fig. 2). The

* American Medical Association Journal, Oct. 27, 1883.

subsequent treatment consists, in most instances, of a daily washing out of the rectum by means of a large double rubber tube with a considerable quantity (usually from three to four quarts) of water as hot as comfortable to bear. Upon the eighth or tenth day, as thought wise, each pin is gently pushed upward and the vaginal end exposed. Each side is then cut off near its juncture, and withdrawn."

The object of this support is to do away with the distortion and puckering of tissues adherent to the deep wire suture, and prevent all strain upon the enclosed freshened surfaces. In this paper I also emphasize the fact that, in cases of complete rupture, I divide the freshened sides of the rent *laterally*, and close with a *continuous animal* suture, so as to make the double V or diamond ◊ shape of the parts to be coapted, as in incomplete rupture.

At the Eighth International Medical Congress, held in 1884, at Copenhagen, I contributed a paper, still further setting forth the views I then held, and with slight modifications advocated the above-described method, using *tendon* from the tail of the kangaroo, instead of catgut. In May, 1887*, I published a further contribution to the study of perineal injuries and the restoration of the pelvic floor. In this article, I advocate a modification in the dissection, in that I carefully find and separate the posterior third of the vagina, *not its mucous membrane*, from the more or less deformed perineal structures. "My dissection is to separate the vaginal muscle from its pathological relations, and is continued so as to reach the lateral sulci, and, in its closure, not only is intended to, but does overcome the patulous condition of the introitus vaginæ in cases of great relaxation. A curved needle, threaded with tendon or catgut, is introduced into the bottom of the wound, and then it is carried carefully, in deep suture, from opposite sides of the *lateral sulci*, behind the vagina. The posterior vaginal space being thus

* The Physician and Surgeon, Vol. ix., Nos. 5 and 8.

approximated, the same suture is continued deeply into the *retracted* ends of the transversus perinei, and tied without extending externally. This, of course, is intended to remain as a buried suture, and subsequent success is dependent upon its aseptic condition. More recently, I have threaded each end of the tendon, and introduced the needles from opposite sides, thus making a double stitch. . . . In a number of hospital cases, well selected, the patient under careful supervision, I have omitted the pins, trusting to the deep buried suturing. At present, I do not feel safe in commending this practice generally, but, if trustworthy, it will be a manifest gain to both patient and surgeon."

In June, 1887, at the meeting of the American Medical Association, Dr. E. W. Cushing, of Boston, in a paper contributed to the Obstetrical Section, reported Dr. Marcy's operation, and gave the result of our experience in associated work. In this paper he claims nothing original, refers approvingly to my methods, but states that the use of catgut, as a continuous suture in repair of the perineum, is due to Schroeder. In a recent publication he writes, "At the meeting of the American Medical Association, in 1887, I reported my method of operating for ruptured perineum, by joining Schroeder's system of buried catgut sutures in layers to Dr. Jenks's method of splitting the flap, followed by a cure in every case."

As we have seen above, in my paper read before the Obstetrical Section of the American Medical Association, in 1883, and again at the Copenhagen Congress in 1884, I distinctly mention the use of the continuous animal suture in perineorrhaphy. In the *Annals of Surgery*, December, 1881, in an editorial upon "Animal Ligatures," I discuss the advantages arising from their use as sutures, and the changes which ensue when antiseptically buried in the tissues. I there advocate the use of the tendon from the kangaroo as a buried suture, taken as a double and also as an over-and-over continuous stitch. I first used, in 1871,*

* Boston Medical and Surgical Journal, Nov., 1871, p. 315.

the buried animal suture in an operation for the cure of hernia, and soon after published the results of a series of physiological, experimental studies upon animals, undertaken to demonstrate the advantages of the buried suture.

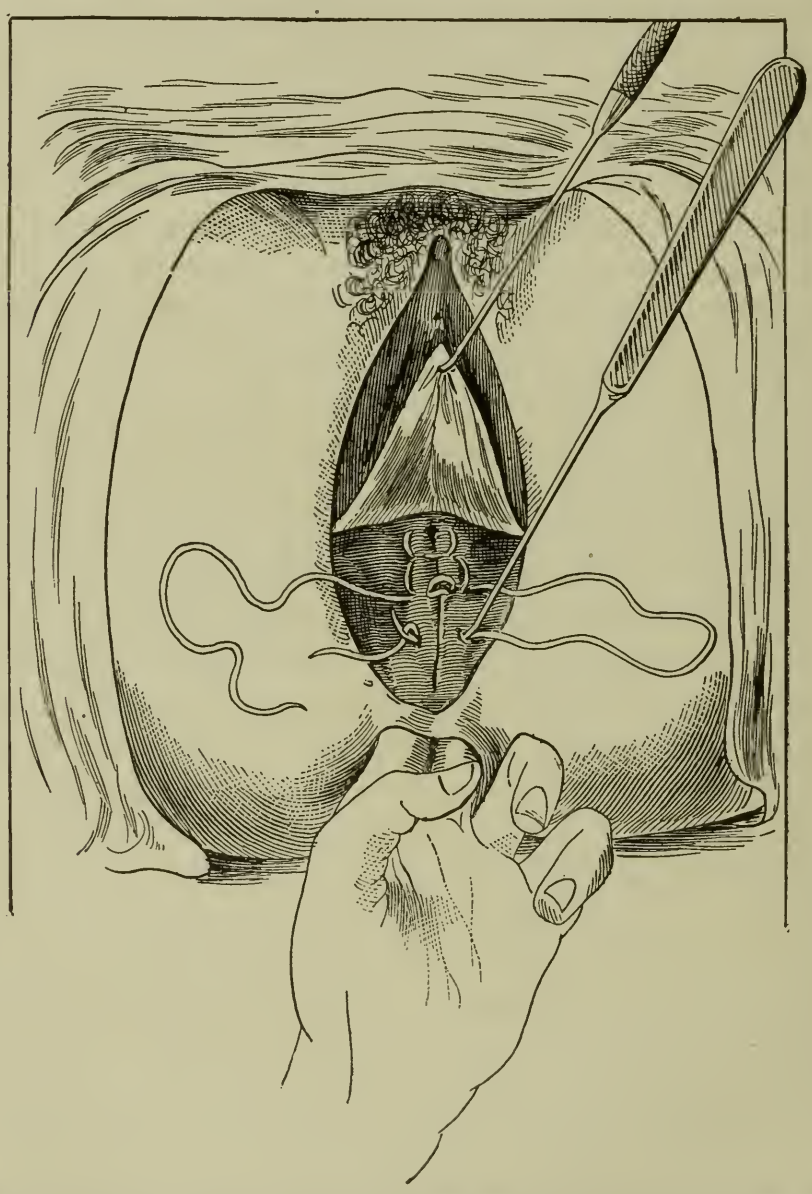
A *resumé* of these studies may be found in the *New-England Monthly Medical Journal*, June, 1883, in a paper upon "The Animal Ligature." "For the same reason, in the use of the deep suture, we have sewed the catgut or tendon with the over-and-over stitch, or the ends from opposite directions through the same opening, after the manner of the shoemaker. The continuous suture has a double advantage. It reduces the number of knots to one or two, which is a considerable gain where a number of stitches are required, and the collateral swelling is equalized by distributing the pressure of the suture throughout its entire length. This insures a uniformity of circulation in the enclosed portion, and thereby lessens the devitalization of the tissues, causing a more sure and rapid process of repair to ensue. This method of suturing is especially to be recommended in the closure of large hernial openings, the ligature of the stump of a uterine tumor, or a large ovarian pedicle." From that time until the present, I have applied the buried animal suture for the coaptation of nearly all wounded surfaces.

According to Martin, catgut was first used in Germany as a deep suture by Werth in 1879. Doléris adopted its use in perineorrhaphy in 1885, and soon after Schroeder recommended it for perineoplasty.

Results, rather than the origin of methods, are the facts sought for by the profession. German surgeons may never have heard of my labors; but, as the records stand, I am clearly entitled to priority in the use of the buried continuous animal suture. The manner of applying the suture, called the shoemaker's stitch, quite unlike any other, I demonstrated at the International Congress, in London, in 1881, and, so far as I know, its originality has never been questioned.

A brief *resumé* of my operation will close a paper already too lengthy. In incomplete ruptures, with more or less prolapse, the transversus perinei muscle can no longer be felt as a band in front of the rectum, and the pubo-coccygeus has

PLATE VII.

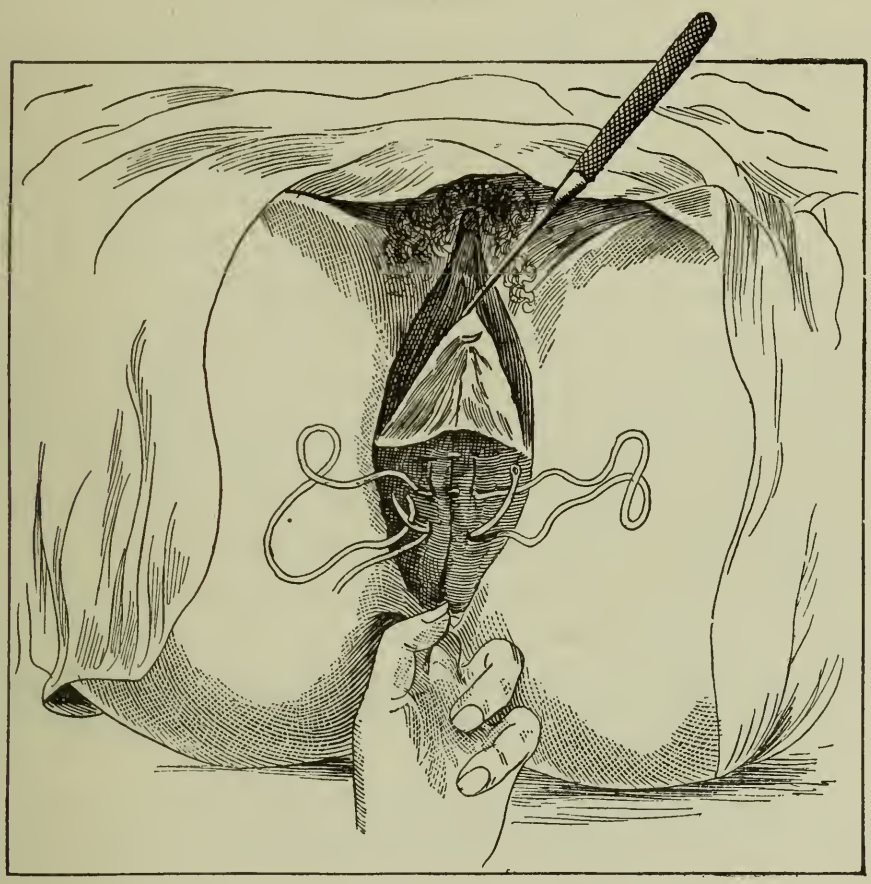


Represents the uniting of the widely separated transversi muscles by the double, continuous, buried animal suture. The posterior vaginal wall is lifted and held by an assistant.

lost its tonicity. The restoration of these, with the various attachments of the sundered groups, is the object sought.

The patient, etherized, is placed on a table, in a good light. The limbs are flexed, and both thighs are carried closely on to the abdominal wall. This position is retained by the aid of assistants or the Clover crutch, which has been simplified by Dr. Kelley, of Philadelphia. Under the hips is placed an inflated rubber irrigating pan, with a large efferent tube, to conduct the fluids into a receptacle under the table. These inflated rubber receptacles are a great con-

PLATE VIII.



Showing the operation conducted as in Plate VII., except a Hagedorn needle with eye added near the point is substituted to serve for the more expensive needle especially constructed for sewing with the Marcy stitch. The needle is rethreaded, with the opposite end ready for withdrawal.

venience, preventing all soiling of patient and surgeon, and were first made for me, nearly ten years ago, by the Davidson Rubber Co., of Boston. Somewhat recently, with a slight modification, they have been introduced to the profession as the "Kelly pad." The irrigation, with a 1 to 2000 mercuric bichloride solution, is under the charge of an assistant, and the entire operation is conducted with due antiseptic care.

The sphincter having been stretched, and the bowel thoroughly emptied, two fingers in the rectum, the posterior third of the vagina is separated with knife or scissors from its vulvar attachments. The recto-vaginal space is easily found without much loss of blood, and the dissection of the vagina from the rectum is carried into the lateral sulci as far as may be judged sufficient. The *separated flap is lifted* and held by an assistant; then I introduce a large curved needle, the eye near the point, armed with tendon, deeply from side to side; the opposite end is threaded and the needle withdrawn, carrying the tendon with it.

The suturing is continued in this way, until the required number of stitches are taken (Plates VII., VIII.). In rectocele, with prolapse and large deep sulci, the buried double stitch is taken on either side, to join the separated fibres of the levator loop with the retracted transverse perineal muscles, and then these are united laterally (Plate IX.).

Usually four or five stitches are required to unite the posterior vaginal fascia, and then the separated ends of the perineal muscles are included by deep sutures. Any other needle and stitch may be used, but I prefer the one above mentioned.

In prolapse, where there is great redundancy of the posterior vaginal wall, a portion of tissue may require to be removed, otherwise the edges of the inverted sides are united vertically. I use the buried. suture, as described above, in recent cases, and seal with iodoform collodion.

In complete ruptures, after a careful refreshing of the

sundered edges, I split laterally, with a sharp knife, between the rectum and vagina, quite sufficiently to permit a free separation of the flaps. Over the sphincter it is usually necessary to carry the dissection in a posterior direction, in order to reach the retracted ends of the sphincter muscle. The lateral dissection must also be sufficiently deep to reach the separated ends of the transversus perinei muscles. To effect this the posterior third of the torn vagina is usually detached.

PLATE IX.

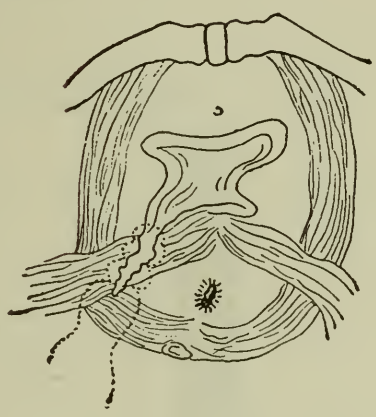


FIG. I.

Diagram showing the union of the deep lateral sulci by the buried continuous double animal suture.

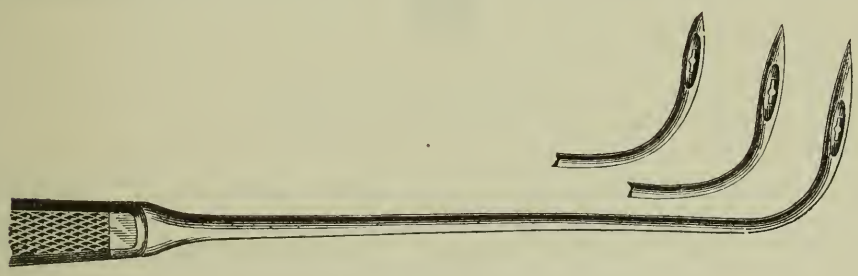


FIG. II.

Needle specially designed for the use of the double continuous buried animal suture. The eye is made large for ease of threading, and the lateral slots hold the suture from slipping.

If the ends of the retracted perineal muscles seem tense when united, I use the lateral supports, applying one or two pins as heretofore described. These serve simply to retain

at rest the coapted parts, and lie parallel to the anus outside of the sutures. If the operation is aseptic, the after-treatment is simply rest in bed, and the cure is complete. The operation should be conducted with the strictest care, since it is difficult to operate upon this portion of the body without contamination of the parts involved. The sutures should be applied under irrigation, and the parts about the vulva covered with towels wet in a sublimate solution. Of all surgical procedures, few can be more dangerous than the deep implantation of infection carried by a septic buried suture.

A new depressor speculum.

It is introduced here, since it has been devised as the result of the studies upon which the principles underlying the methods advised for the restoration of the perineum are based. Its simplicity offers little need for explanation. The vaginal portion is constructed so as to cause a minimum of pressure upon the vulvar outlet. It is irregularly broadened within, so as to secure a firm hold without slipping upon the levator loop, and this allows of depression without overstrain of the external tissues, and permits the foreshortening of the instrument to the minimum, scarcely more than one inch in length. When the uterus is of normal mobility, the cervix may be easily brought to the vulva. The anterior vaginal wall and the uterus are, by its use, rendered much more accessible. The handle is made hollow for the escape of the irrigation fluid, and roughened for a secure hold.

My method differs from others in the following particulars: —

1. The dissection of the posterior third of the vagina, not its mucous membrane, from its vulvar attachment, carried, as deemed necessary, into the recto-vaginal space, and the retention of this flap.

2. In rectocele with prolapse, the closure of the deep layers of post-vaginal fascia by a continuous buried animal suture, taken either in single or double stitch.

3. In lifting forward the vagina from its vulvar attachment, the retracted transverse perineal muscles, with their connections, can be reached and closed also by a deep buried suture, making in this way a true restoration of the pelvic floor.

4. Coapting all superficial surfaces by a buried animal suture, applied in a blind, continuous stitch from side to side, covering the same, when dry, with iodoform collodion.

5. The application of lateral supports, pins, external to the sutures, as a splint, to hold the parts in complete apposition without strain.

6. In complete ruptures, the lateral dissection, the joining of the rectal and vaginal edges with buried sutures, and then finishing the operation as in incomplete ruptures.

THE DIAGNOSIS AND TREATMENT OF CANCER OF THE BREAST.

BY J. COLLINS WARREN, M.D.,

Associate Prof. of Surgery in Harvard University, Surgeon to Mass. Gen'l Hospital.

Read Feb. 14, 1889.

THE great changes which have recently taken place in the treatment of this formidable disease have invested it with a new interest, and it has therefore seemed to me that the subject of this paper was as appropriate a one as could be presented to your Society by the general surgeon. Until within the present decade, the success which has attended operative interference has been so unsatisfactory that many surgeons, among whom I should count myself, had become discouraged, and had chiefly confined themselves to operations upon exceptionally favorable cases, or to those which demanded operative interference for the relief of suffering merely.

The old method of operating contemplated either a removal of the mammary gland with a portion of the integument, or even of a portion only of the gland and other tissues immediately surrounding the disease. When enlarged glands were felt in the axilla, an incision was prolonged from the wound a short distance beyond the border of the pectoralis muscle, and the glands were shelled out with the finger or some blunt instrument. It was in rare instances only that more radical operations were attempted. The bold methods advocated by Mitchell, Banks, Kenster, Gross and others are now in course of adoption by the surgical world, and a new mass of statistics is gradually being accumulated, which is rapidly furnishing material for reopening the study of this question.

It is important to lay some stress upon the kind of material that should be used for this purpose, for recent discussion has brought out very decided opinions from men whose views should be regarded with the greatest respect, but who are not disposed to look upon the so-called "completed operation" as an advance upon the older methods.

There are good grounds for rejecting the great mass of statistics which have been compiled previous to the present decade.

In the first place, microscopic examinations are wanting in the majority of cases, and many of those which have found their way into reports of cases have not been reliable. Not only have some cases reported as carcinoma proved on further study to belong to non-malignant growths, but there are also types of disease regarded as forms of inflammatory affections of this organ in which the experienced pathologist is able to detect early changes in the growth of the epithelial structures, which are the first steps in the development of a carcinoma.

Again, although the antiseptic treatment of wounds was first introduced nearly a generation ago, it is only within a few years that the system has become so generally perfected that the average surgeon has been able to arrive at the results contemplated by its author. Each succeeding year brings with it a material improvement in mortality statistics, and it would be manifestly unjust to estimate the amount of danger and suffering entailed upon a patient subjected to the operation from material which has been collected previous to the last few years.

The advocates of the completed operations are now laboring under the same difficulties in educating the surgical public up to their standard of operation, precise rules for which are vigorously laid down, and which should be closely adhered to by those attempting to give the new method a proper test. When these conditions shall have become so familiar to all surgeons that cancer will be recognized during

the earliest periods of existence, that the diagnosis will be promptly followed by an operation, that the operation will be so thorough in character that it will come up to the most exacting standard, and that the patient may reasonably expect the full benefits of the antiseptic system, there will, I think, be but little doubt that the very unfavorable prognosis now generally accorded to this disease will have to be materially modified. Let us consider first what may be done in the way of an early diagnosis.

When a woman of middle age presents herself with an indurated mass in the mammary gland, which has already involved the skin, and there exists at the same time a retraction of the nipple, and possibly a slight fulness of the axilla of the same side, the diagnosis is so clear that a tyro would find it hard to make a mistake. The problem, however, is far more difficult, and often embarrassing, when an anxious woman has only an indurated spot in the breast to show, and expects the surgical expert to give a definite opinion. There are a few facts bearing upon the etiology of this disease which it is well to bear in mind in making up an opinion.

Among the most important of these is the age of the patient: according to Gross * "the largest number in 1,622 cases in which the age of the patient was noted was found to be between forty and fifty years, the next largest number was found between fifty and sixty years, the next in the thirties, and the next in the sixties. The earliest age at which cancer of the breast was reported is given by Henry as twenty-one. Very few cases are seen before the age of twenty-five. A case under my care at present in the hospital is that of a girl of twenty-two, and owing to its rarity deserves record here.

Lizzie M., 22 years 6 months old. Born in Boston. No cancer in her family so far as known. Previous history good,

* American Journal Medical Science, April, 1888.

unmarried. Catamenia regular. Presented herself at the Massachusetts Hospital, January 25, 1889. Three months before noticed a lump in the left breast, and almost at the same time a gland in the axilla. She is well developed and nourished. In the upper and outer quadrant of the left breast there is an indurated mass the size of an English walnut. There is no involvement of skin, but a slight dimpling exists. No retraction of nipple. There are some enlarged glands above the clavicle, but these are said to have existed for a long time previous to any breast-disease.

The completed operation was performed January 26th. The glands did not extend upward beyond the lower margin of the pectoralis minor. There was considerable shock, that night the temperature falling to 95.8. Pulse, 120; respiration, 48. Prompt reaction took place, however, and the convalescence has been rapid and without further complications. Suppuration around one suture and opening of the wound at that point: otherwise union by first intention. Microscopic examination of tumor by Dr. Whitney. "A dense, somewhat translucent, retracting nodule deep in the breast. A section presented a whitish fibrous-looking surface, with mucous, small opaque yellow dots and lines. Microscopic examination showed it to be made up of a thick, dense, small-meshed connective tissue ground-work, in the spaces of which were solid masses of rather small cubical epithelial cells, many of which were fatty degenerated. Scirrhous cancer.

Another sign of value is the locality of the tumor, if we may accept again the testimony of Gross. In 820 cases, the disease was found in the upper and outer quadrant in 206, near the nipple in 235, and in the upper hemisphere twice as often as in the lower hemisphere. Speaking from general impression only, I should be inclined to agree with the deductions made from these figures; namely, that we are more likely to find the disease in the upper portion of the gland, and more likely also to find it nearer the axillary than the sternal margin of the gland.

The influence of heredity has often been quoted as a characteristic peculiarity of cancer. Sir James Paget has cited a number of remarkable instances of the disease occurring among relatives. An example of this tendency was afforded by one of my own cases. Her maternal grandmother died of cancer of both breasts, at the age of thirty. A maternal aunt died of cancer of the breast. A cousin on her mother's side died of cancer of the rectum. An aunt on the father's side was operated upon recently at the Massachusetts General Hospital for a cancer of the breast. But Gross found a family history of cancer in only 8.50 per cent. of his cases.

An undoubted record of the prevalence of cancer in a family would, I think, have considerable weight in enabling me to make a diagnosis in a doubtful case. The difficulty in obtaining a record which would approach in accuracy the standard now demanded as evidence of the existence of cancer would be almost an insuperable obstacle. The information ordinarily to be obtained from a patient bearing upon this point is practically of little value.

A slight dimpling of the skin is thought by Gross to be a sign of considerable importance, as one which is to be found at an early stage of the disease. This is due to a pulling upon the fibrous bands which attach the skin to the mammary gland, by the contraction of the diseased portion. I have seen this depression in cases in which I made the diagnosis of chronic mastitis, and there seems to me to be no ground for assuming that an inflammatory condition of the mammary tissue in a state of involution should not give rise to such an appearance. In fact, we may have all the external appearances of cancer of this organ simulated by inflammation. A striking illustration of this fact was observed by me in the breast of the wife of a brother practitioner. In this case, there existed, in addition to an indurated nodule in the outer hemisphere of the breast, a retraction of the nipple, and an enlargement of the axillary glands. The nodule proved, however, to be inflammatory, and dis-

appeared entirely a few months afterwards; and the patient at the present time, several years after the disappearance of the swelling, is in excellent health. Retraction of the nipple is indeed often a misleading symptom; for it is not infrequently found in breasts that are entirely healthy.

Many of the cases submitted to the surgical specialist are therefore, as I have said, extremely difficult to diagnosticate in the early stages of the disease; and yet this is the period which is generally recognized as the one in which diagnosis is of great value. A striking example of the difficulties which attend such a case is afforded by a patient sent to me in March, 1888, by Dr. Brown, of Reading, Mass.

Mrs. P., 45 years of age, received a blow from a sharp object eight weeks before. The blow was immediately followed by a swelling below the nipple, at the point of injury. In a few weeks the swelling had diminished somewhat, but a small indurated mass was still to be felt at that point. There was no dimpling of the skin, and no enlargement of the glands in the axilla. The patient's general health was good. The growth appeared to be of an inflammatory nature. I advised her to let me see it again in a few weeks. She visited me a second time, on May 19th, and the breast was then found to be entirely infiltrated with cancerous disease, presenting a hard, brawny mass; the glands in the axilla were also considerably enlarged. I then, of course, recognized a very malignant type of cancer, and advised no operative interference. She received similar advice from several other surgeons, but eventually had it drawn out "by caustic"; and Dr. Brown informs me that she died Dec. 11th. It is probable that operative interference at any period would not be attended with satisfactory results in such a malignant type of the disease, but it would certainly be more creditable to surgery were it possible to give a definite diagnosis in doubtful cases, for it is in precisely such a class of cases that the surgeon is most likely to be consulted.

An old method of ascertaining the nature of morbid growths consisted in the introduction of a grooved needle into the tumor, and submitting to microscopic examination such fragments or juices as could be extracted. Quite a variety of instruments were devised for this purpose, but, owing to the danger of producing inflammation by such a manœuvre, unprotected by antiseptic methods, and to the imperfect microscopic technic, which consisted principally in poking the fragments apart with needles, no satisfactory results were obtained, and the method gradually fell into disuse.

It occurred to me about a year ago that this plan might be revived under the favorable auspices of antisepsis, and perfected by the improved microscopical methods. An instrument devised by Dr. S. J. Mixter for removing grains of powder from the skin was suggested by him as suitable for the purpose. It consists in a fine canula (No. 6 Charrière filière), sharpened on the inner edge, which, when rotated by means of a handle at its upper end, acts like a trephine to remove a minute circular disk of skin. I have had a number of different sizes made, gradually enlarging them as experiment showed the absence of unfavorable results attending their use, until I have reached as high as Charrière's No. 12. This gives a diameter of about 4 mm.,— a size sufficiently large to take a section of ample dimensions for microscopic study, even from a transverse section of the fragment removed. A small staff is kept within the canula to protect the cutting edge when not in use, and to remove the specimen from the canula.

The method of making an examination with this little instrument is so simple that it can be easily carried out in one's office. A few drops (about ten) of a five per cent. solution of cocaine is injected subcutaneously over the nodule to be examined. The skin, having been carefully cleansed with a weak solution of bichloride of mercury, is divided with a sharp-pointed bistory, making a minute wound, suffi-

ciently large to introduce the exploring canula. The instrument is then pressed gently against the new growth, and lightly rotated between the thumb and middle finger. As little pressure should be exerted as possible. After the canula has penetrated the growth the desired distance, from half an inch to two inches, it should be withdrawn a distance of two or three mm., and then directed in a line slightly oblique to the direction which it had first taken. By rotating now a short distance in the new direction, the cylindrical mass of tissue contained within the canula will be divided, and can be moved from the diseased mass. The worm-like mass of tissue pressed out from the canula by its staff should be immediately placed in a weak solution of alcohol, which gives place the following day to strong alcohol; or it can be placed upon the freezing microtome, and longitudinal sections be taken for immediate study.

When the canula is carefully introduced, a segment of the tumor can be obtained showing the various appearances from the extreme periphery to the central portions, so that there is no danger of obtaining a false impression owing to a partial examination only of the growth.

In one of the first cases in which I employed this method the growth proved to be a chronic mastitis, with cystic degeneration. The section showed clearly the interstitial fibrous tissue, with acini and ducts of the glands supported in it. In this case there was great mental depression and nervousness, which by a definite diagnosis it was possible to relieve.

The following is a sample case, showing what may be accomplished by the method: —

Miss C., 50 years of age, always healthy, has had for several years a small lump near the axillary margin of the left breast. Six months previously, had noticed a slight enlargement, since when it has been under the observation of her physician. As it did not disappear, she was sent to me. I used the finest canula (No. 6), and sent the specimen to Dr. Whitney for examination. An examination of a frag-

ment in the fresh state showed clumps of epithelial cells floating in some of the fluid serum removed, and the diagnosis of cancer was made, which was confirmed after removal of the breast. When the larger canulæ are used, the alveolar structure can easily be demonstrated.

In the case just mentioned, the little wound made by the knife was covered with antiseptic cotton, and sealed with collodion, and at the time of the next visit of the patient the wound was found to have been healed by first intention. Prompt healing of the wound has always been the result in those cases hitherto examined in this way, and the patients have complained of no particular pain or inflammation as the result of the operation. In one case, a small artery was wounded; but healing took place promptly afterwards. The boring of the canula through the dense morbid tissue might be supposed to cause some pain; but this is avoided by the gentle rotary motion of the instrument. I have succeeded in making a diagnosis in a large variety of morbid growths explored in this way, in doubtful cases.

There is a certain type of this disease in which an early diagnosis is of special advantage, as an operation at this period affords a favorable prospect for a radical cure. I refer to those cases where the disease appears to supervene upon a chronic inflammatory process, and the mass can be removed while the cancerous degeneration is still limited to the inflamed nodule. Such a case is the following:—

Miss W., 50 years of age, sent to me by Dr. F. I. Knight, had noticed an indurated lump in the upper hemisphere of the right breast, six months previously. It had not increased in size since that time. No glands were felt in the axilla. I advised an operation without previous exploration. On laying open the breast, the appearances were so suggestive of a chronic mastitis that I thought I had made an incorrect diagnosis, and did not open the axilla.

The following is the report made by Dr. Whitney of the microscopic examination:—

"The whole gland is replaced by a dense white tissue, in which were several cavities, the largest as big as a robin's egg. These were lined with a smooth membrane, and had evidently contained fluid. On microscopic examination, the basis of the growth was found to be composed of a dense fibrous tissue. In this were embedded the altered glandular elements. In places, the ducts were dilated, evidently the origin of the large cysts seen in the gross. Here and there the acini of the gland were reduced in size, and the cells smaller, as if undergoing atrophy. In other places the cells had proliferated, and extended widely from their original place in a plexiform network into the surrounding tissue. In places these lines of cells appeared to follow the course of the lymphatics. Here and there a compound granular cell was seen, but in general comparatively little fatty degeneration. The growth seems to be a diffuse, interstitial fibroma, in which the gland elements are now beginning to proliferate actively. Commencing cancer."

Although no dissection of the axilla was made in this case, I have expressed a very favorable prognosis, as it seems to me that the very early stage of development of a cancer precludes the possibility of infection beyond the point of inflammation.

And this brings me to another branch of our subject, namely, the question of the local origin of the disease.

There are some very high authorities in favor of the view, that, although not necessarily a blood disease, it is not, on the other hand, purely of local origin. Such is, I think, the inference to be drawn from the attitude assumed by Dr. R. M. Hodges in his recent paper upon excision of the breast,* which has, I need not say, excited much interest. Sir James Paget says, "Once formed, the secondary diseases and much of all that follows, even to the inevitable end, may be due to transference of cancerous materials from the primary

* Boston Medical and Surgical Journal, Nov. 29, 1888.

growths. But I do not think that all the secondary and yet later events can thus be explained. We have no reason for believing that the morbid material of the blood is always exhausted in the formation of the primary cancer, and it seems more probable that in some form this material remains or is renewed, and that to this, as well as to transference from the primary disease, the secondary and later changes are to be ascribed."

There are many cases which give grounds for such a belief. Thus, cases reported by Dr. Gouley† of excision of the breast for scirrhous cancer, with recurrence twenty, twenty-four, and twenty-five years after operation, are suggestive of more than purely local influences. But without attempting to offer elaborate evidence *pro* or *con* bearing upon this question, I must enroll myself with those who believe in the purely local origin of cancer. A familiarity with the habitual progress of the disease from one anatomical structure to another; the steadily diminishing size of the cancerous deposits as we proceed from the periphery towards the centre of the lymphatic system; the analogy between the manifestations of this and other forms of disease whose local origin is well recognized,—are all so strongly suggestive of a local origin, that it is difficult in the light of modern pathology to accept any other interpretation.

It seems to me, therefore, that with the benefits accruing from the opportunity to make an early and certain diagnosis, if we undertake to remove, not only the tangible evidences of disease, but all those structures which experience shows are habitually involved at a comparatively early date, we have a right to hope for more satisfactory results than have hitherto been obtained.

Let us have a mutual understanding as to the essentials of the so-called completed operation. Surgeons differ somewhat as to the amount of breast integument that should be

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† New York Medical Journal, Oct. 13, 1888.

removed. The followers of Gross, who makes a circular sweep of the whole breast, are comparatively few, and even he now proposes to abandon it in cases where he can keep the patients under observation, and thus be enabled to remove promptly very recurrent nodules. Butlin, whose work on the operative treatment of malignant disease has attracted so much attention lately, does not think necessary even to remove all of the mammary gland, although he does attach importance to the inclusion of a wider margin of integument than the old operations contemplated. It is generally agreed at present, I think, to remove the whole gland, and a more liberal supply of integument than formerly. Sometimes vertical incisions are preferred to the customary horizontal cuts, as affording better drainage. But the most important feature of this part of the new operation is the careful dissection of the fascia from the pectoral muscle, for it is in this tissue that capillary lymphatics are concealed, which furnish hiding-places for the outposts of the disease. Careful attention should also be paid to the margin of the pectoral muscle: not only should the fascia which comes in the axilla be dissected off from it, but its lower border should be well freed from fat and connective tissue. The axilla is best opened by a cut through the skin along the edge of the pectoralis, until we come to the edge of the coraco-brachialis. Continuing down on this muscle a short distance with the knife, the skin and superficial fat drop away sufficiently to disclose the great vessels lying beneath a thin fascia. Opening this fascia backward along the line we have come exposes the contents of the axilla, and especially the branches of the vessels, which can now be secured as the operation progresses. A pyramidal mass of fat is now dissected out, the apex reaching sometimes to the clavicle, the base frequently extending deeply on to the subscapular group of muscles. The glands which lie near the clavicle will have to be removed separately, and can best be enucleated from the neighborhood of the vessels by the finger.

If they are numerous, the pectoralis can be separated on the line selected for the ligature of the axillary artery below the clavicle, and the glands and some of the loose tissue can then be readily removed. This plan I recently employed in the case of a lady, fifty years of age. The wound healed without complications, and the patient made a rapid convalescence.

This operation is doubtless far more severe than any of the old methods; but under careful antiseptic precautions, which are constantly being improved upon, I can not help feeling that the mortality rate is now on a descending curve. Dr. M. H. Richardson,* in his paper on the results of this operation, is inclined to think that the mortality is increased 50 per cent. by the new method. This impression was obtained, I think, from a study of some of the earlier series of the "completed operations." It is also Butlin's opinion. As the increased mortality rate has been used as an argument against the completed operations, I have taken pains to look up the results of my own operations within the last few years, and find that, in 47 consecutive cases of excision of the breast, there have been no deaths. In 32 cases only of these was there a dissection of the axilla. The duration of convalescence is much shortened, and complications are rare. Shock is a complication to be guarded against always, but in comparatively few cases has this been of sufficient gravity to cause alarm. I am inclined to think powerful antiseptic drugs have been responsible for more than one case of fatal poisoning, before the proper limit of their use was generally understood.

A more minute knowledge of the actual course of the disease through the lymphatic vessels, which ramify along the border of the pectoralis and in the axillary region, may enable us to curtail materially the present wide range of dissection. Here is a field for future research.

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* Boston Medical & Surgical Journal, August 30, 1888.

Sir Spencer Wells * has shown, from Dr. Creighton's observations, that tumors of the sweat glands of the axilla may form nodules on the axillary margin of the breast and in the axilla. In these cases, the disease has no connection necessarily with the mammary gland, and the breast need not be removed. The study of the pathology of this region, in spite of many valuable works, cannot as yet be considered as exhausted.

In 605 cases collected by Butlin, the mortality was 15.85 per cent., or 1 in 6. Cheyne reports 37 of Lister's cases, with 2 deaths. In twenty-four of these cases the axilla was dissected. In Butlin's 40 cases there were three deaths. Butlin thinks that the mortality of the completed operation is twice as great as that when the breast alone is removed. Gross makes out a mortality of 14.24 per cent for all kinds of operations. In 43 completed operations performed by himself, there were only two deaths; one from fat embolism, and one from pneumonia. In ten additional operations by his colleagues, recovery took place in every instance. The mortality in this series was therefore only 3.7 per cent.

In regard to the number of cures effected by operative treatment, the percentage figures seem discouragingly small; but when we remember that in old times a case of permanent cure was regarded as a surgical curiosity, it must be acknowledged, I think, that a tangible improvement has taken place. Gross obtained from his collections a percentage of 11.83, when the patient was alive and well three years after operation. As in only 2 per cent. of cases did recurrence take place after three years of immunity, this limit has been accepted as an indication of cure. Butlin thinks the percentage of cures should be placed as high as 12 to 15 per cent. at the present time.

In those cases in which a fatal termination was reached before the three years' limit, Gross found that there was an

* Morton Lecture on Cancer and Cancerous Diseases. London: J. & A. Churchill, 1888.

average prolongation of life of ten months when the axilla had been dissected.

I regret to say that I have not had an opportunity to ascertain the histories of all the cases of my series. I have, however, been able to follow the history of several mentioned in a former paper,* and will briefly refer to them here.

Three years and a half immunity. Mrs. B., Amesbury, Mass., about 60 years of age. Disease had existed two months. A hard and voluminous cancer of the breast, with large glands in the axilla, extending as high as the clavicle. The completed operation was performed. The case was not a promising one, and in former times I should have declined to operate. The operation was performed July 9th, 1885. Dr. H. G. Leslie writes me, under date of January 14, 1889: "I have to report that Mrs. B. still remains in perfect health, with no signs of the recurrence of the disease."

Four years' immunity. Miss B., about forty years of age, was operated upon in December, 1884. First noticed a tumor in the breast the previous winter: but an eczema of the nipple had existed in 1883. No glands were felt in the axilla; but the completed operation was nevertheless performed, with the result of finding one small nodule in the axilla. She was married October 15th, 1888, after an engagement of seven years' years standing, no sign of a recurrence having shown itself, and her health having greatly improved.

Four years and a half immunity. Miss J., Haverhill, Mass., was operated upon in June, 1884. The breast was very voluminous, and the cancerous nodule was small, and situated near the sternal margin. The axilla was opened, but no glands found. Dr. M. D. Clarke writes me, under date of January 30, 1889, that he has recently visited Miss J., and that there has been no return of the disease.

Five and a half years' immunity—recurrence. Grace M., 45 years of age, was operated upon in the hospital, in July,

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* Boston Medical and Surgical Journal, February 17, 1887.

1882. There was no gland in the axilla. Had first noticed a lump three years before; no return of the disease until the autumn of 1887. A lump was then felt in the axilla.

A nodule the size of a hen's egg was removed from the axilla in July, 1888. It was found to be a colloid cancer. There was no return in the breast. At the present date both breast and axilla are free from disease; but the patient's general health is not good, and I fear a development of the disease internally. I cannot help feeling that, had the completed operation been performed in this case, there would have been no recurrence.

Ten years' immunity. M. E. M., 30 years old. Disease four years' duration. An ill-defined tumor of the right breast, the size of an egg. Operation performed September 18, 1878. The tumor, on section, was found to be very dense, and infiltrating nearly the whole breast. The breast was excised, but the axilla was not opened. The patient was living in January, 1888, and there had been no return of the disease. This case is taken from the record book of the hospital; and, as no microscopic examination was made, and I have no recollection of the case, the diagnosis may be considered doubtful.

If we add to Gross's 53 cases of completed operations my own 32 cases, we have a series of 85 cases, with only 2 deaths. It seems fair to assume, therefore, that a mortality rate of 3 per cent. is not too much to hope for in the future.

If Butlin, whose operations are much less radical than those of Gross, thinks that cures are obtained at the present time in 15 per cent of the cases operated upon, may we not hope for a still further increase of this percentage if a ready method of diagnosis enables us to operate in the earlier stages of the disease?

I do not think it is too much to expect that, when the statistics of the next few years are rolled up and counted,

we shall find that surgery has succeeded in accomplishing a cure in 20 per cent. of the cases.

I am well aware that many interesting points of this subject have not been touched upon, but the intended scope of this paper will hardly authorize my trespassing further upon your time.

DISCUSSION.

Dr. J. F. Frisbie: Does Dr. Warren believe the case of Mrs. P., to which he referred, was the result of the blow on the breast?

Dr. Warren: I am inclined to the opinion that the blow was the cause of the cancer which developed in her breast.

Dr. Frisbie: Then you believe cancer may follow injury as a result of that injury alone?

Dr. Warren: Yes. There are cases where no other reason can be given.

Dr. John C. Irish: I have been much interested in the very instructive and practical paper that has been presented to-day. The ingenious device by which Dr. Warren secures a portion of the morbid growth for microscopical examination is very valuable; for it will give great aid in the early diagnosis of tumors of the breast, that is, as to their malignant or non-malignant character. With women of middle or advanced age, every solid growth in the breast is so liable to contain cancerous elements or to acquire them, even if it is benign at first, that my rule of action is to advise their immediate removal. If the disease is malignant, its early removal is of unquestioned advantage; if benign, this treatment by excision is not inappropriate. One very important matter that Dr. Warren presents to us for discussion is the question, Whether in all cases of extirpation of the breast for cancer or supposed cancer, we should make the completed operation, so-called, which consists of as thorough a removal as possible of all the fat and glands in the axillary space. Whenever the latter are appreciably affected, there can be no question as to the necessity of the completed operation. But when there is no apparent disease in the axilla, is there sufficient reason for converting a simple surgical operation into a severe and formidable one? I believe not, for the following reasons: —

First. In a large proportion of cases, the completed operation will permanently cripple the corresponding arm and hand; that is, the patient to a greater or less degree is forever incapacitated from performing work.

Secondly. Since it is impossible to remove all the glands of the axilla by an operation that is continued only a reasonable length of time, we have left a nidus for the reappearance of the cancer; and I do not see any reason why a portion of the glands may not afford just as good a one as the whole of them. Therefore we would logically infer that the completed operation must be a failure in its attempt to prevent or even retard a recurrence of the disease.

Thirdly. The cases of permanent recovery that have followed excision of the breast have been examples of the incomplete operation, for the most part. None of these cases could have done better if they had had the completed operation, and most of them would have done much worse; for most of them would have been permanently crippled instead of completely cured.

Dr. Hodges, last Fall, published, in the "Boston Medical and Surgical Journal," an article in which he gave the statistics of a large number of excisions of the breast alone, (that is, in which the incompleted operation was made,) and in which the cancerous disease afterwards reappeared, either in the scar or elsewhere. Among these cases, the secondary malignant growths recurred first in the axilla in only three per cent. Now, if these statistics of Dr. Hodges are reliable, — and no one, so far as I know, has questioned their correctness, — in one hundred cases of excision of the breast alone, the cancer will return in only three cases in the axilla first. Now, are we justified in submitting these one hundred cases to that formidable surgical procedure, "the completed operation," instead of the simple excision of the breast, when by so doing we shall kill ten of them, and harm or cripple many of the remainder, when we have only the hope of curing or benefiting three? Could a surgical operation with weaker legs to stand upon, logically speaking, be proposed?

Dr. A. P. Clarke said that he had for a long time held to the view that cancer is a local instead of a constitutional disease; and since accepting that view he had been accustomed to advise that an operation for the removal of a cancerous breast be done

with the least possible delay. By means of the microscope an early diagnosis can be made, and much valuable time saved, instead of being lost, as it formerly was, when it was deemed necessary to wait until the disease had become so well pronounced that but little hope for recovery, after an operation had been decided upon, could be entertained.

He was much pleased with the little instrument devised by Dr. Mixter, and shown by Dr. Warren, for the removal of a small section of the growth, before its excision, for purposes of microscopical examination. He agreed with the reader that all the affected glands in the axilla and vicinity should be removed, however extended the incision has to be carried in order to accomplish this. This method he had followed in his own practice for some years, and he well remembers having been called to assist Dr. Marcy in his first case, about twenty years ago. At that time the method of removing the affected glands of the axilla was hardly known or practised in this country; but the results obtained by Dr. Marcy, as well as by the speaker, showed that quite a large number of the cases operated upon made a permanent recovery. In regard to the impairment of the arm occasionally resulting, as has been mentioned, this should not be regarded as an objection to the operation, as those results occurred in the earlier cases when the glands were removed, and subsequent experience has taught us how to preserve more of the nerve branches that pass through the axillary space and to the arm, injury to which caused the untoward result. There is another class of cases that sometimes occurs, not mentioned by the reader, in which, after operation for removal of a cancerous breast and affected glands of the axilla, though there is no recurrence of the disease at the former site of the operation, there is a development of cancerous disease at a distant part or in a neighboring organ. In one case occurring in Dr. Clarke's practice, that of Mrs. L., aged 45 years, he removed, on November 19, 1880, the left breast and affected glands of the axilla, on account of cancer. The patient recovered, and enjoyed good health for five years, when she began to show signs of cancerous cachexia. After much severe suffering, she died, November 18, 1886. The autopsy showed that there were extensive deposits of cancerous matter in the liver. The disease appeared in the form of whitish spots of a circular shape and various sizes. These of

spots also, at first view, had the appearance of ulcers, but on closer inspection were found to be firm and smooth, and each was depressed slightly in the centre. On section, they were noticed to be hard or schirrous, and yellowish in appearance. Some of the deposits were much harder than others, having the appearance of age, while others were of quite recent date. Some were an inch in diameter, others of the size of millet seeds. The right kidney contained a few recent deposits similar to those in the liver. There was no appearance whatever of any return of the disease at the original site. The question that is of interest is, Was the occurrence of the disease in the liver due to infection derived from the breast before the operation? The extreme hardness of some of the cancerous deposits indicated great age. The speaker believed that if he had been called at an earlier date to excise the breast, the patient would have escaped further infection. Other cases of a somewhat similar history the speaker had seen, but they tended to show that cancer of the breast is a local instead of a constitutional disease, and, therefore, we are justified in resorting to excision of the cancerous breast at the earliest possible date. He would like to hear Dr. Warren's explanation of the secondary deposits in the liver.

Dr. Warren: Secondary deposits in the liver may come about by possible extension of the original disease into the substance of the pectoralis muscle; thence it may go to the thorax, and then we may have a cancerous pleurisy. If an internal depot is once established, a new metastasis in different directions may occur.

Dr. F. L. Burt remarked that the differences of opinion of authorities has its influence on other men who are not authorities. Both the time and extent of the operation are of importance. Dr. B. has seen recurrence of the cancer on the line of the cicatrix. He believes that the majority of cases which need any operation require the completed operation. The "American System of Gynæcology" has an article by Dr. Gross, in which there are pictured wounds, both open and closed. Possibly this makes no difference in the recurrence. He has seen some operations where a great amount of skin was removed, but the wound was closed, and the patients went home in three weeks. Of thirty-five cases,

the later ones went home in eighteen days, and the healing was by first intention; which is very different compared with several months when the wound is left open. He has seen two cases of recurrence. One recurred in a year and a half, and the other recurred in four weeks in the skin.

Dr. Mary E. Bates asked Dr. Warren, if, on general principles, he would remove a growth the size of a hen's egg?

Dr. Warren: Some growths of that size have been found to be cystic on exploration, and the fluid ran out through the canula, and all then collapsed. It is a good rule to use the exploring canula in doubtful cases.

Dr. S. J. Mixter: The punch spoken of by Dr. Warren was devised by me to fill a want Dr. Warren noticed and had mentioned to me, namely, something that should take the place, in solid tumors, of the aspirator in tumors with fluid contents. Instruments were long ago invented for tearing shreds of tissue from tumors and organs situated beneath the surface of the body, the best form being a very small pair of forceps that could be introduced through a trocar canula or aspirator needle. These, however, gave but small shreds, which were not large enough for sections, and were unsatisfactory for examination in every way. The instrument shown is simply a steel tube, which may be of any convenient size, fitted with a cylindrical handle, and sharpened at the end by being bevelled from the inside, the edge being at right angles to the axis of the tube. By making a puncture through the skin with a tenotome and introducing the punch through the opening, it is made to cut its way as far as necessary by rotation with slight pressure. The tube is then withdrawn about a quarter of an inch, the point turned to one side, and again advanced and rotated, thus cutting off the lower end of the cylinder. The finger being placed over the upper end of the tube, it is then withdrawn, when the piece of tissue is pushed out of the tube by a plunger. In this manner any solid tumor that could safely be reached by the aspirating needle can be examined. The pain of the operation is slight, and may be relieved by a deep injection of cocaine. I have examined in this manner tumors of the breast, tongue, face, antrum, uterus, deep-seated tumors of the neck, etc.

It has been stated that dissection of the axilla is not called for,

as it cannot be complete in any case, as the region above and behind the axillary vessels and nerves cannot be reached. Of course when the disease extends from the axilla in every direction, as in advanced cases, a thorough dissection cannot be made. But I have found by injection of the lymphatics from the breast, that the course of the vessels and chain of glands is over the edge of the pectoralis major, close to the muscle, and then towards the apex of the axilla, *below and in front of the vessels and nerves.* Unless the disease in the axilla is far advanced, we find no glands above them. As another objection to the completed operation, it has been stated that the arm must necessarily be disabled. By observing the rule laid down by Kuster, that the subscapular nerves be saved, and by preventing the glueing of the arm to the side by the cicatrix, these difficulties may be overcome. By careful dissection the nerves may easily be saved, and by stitching the skin high up in the axilla by a quilted suture to one of the upper serrations of the serratus magnus, in the manner that I have described elsewhere, there need be no cicatricial contraction. By making the incision so that the line of suture of the breast wound is vertical, and prolonging this incision, not along the middle of the axilla, but *above* the axilla, high up on the pectoralis muscle, the final line of sutures, when the arm is at the side, is in full view in front. By the use of this method, in a considerable number of cases I have been able to give a useful arm, and one that could be easily raised above the head,— even in cases where it has been necessary to remove a large part of the pectoralis major, and where a large surface was left to heal by granulation.

Dr. Henry O. Marcy stated he had listened to the paper of Dr. Warren with exceptional interest, not alone on account of its scientific merit and practical instruction, but because it marked a departure almost revolutionary from the teaching which had dominated the surgical thought of Boston, particularly as representative of the views emanating from the Massachusetts General Hospital.

Twenty years ago it had been his good fortune to be the pupil of the late Dr. Bennett, of Edinburgh, who strongly held to the opinion that cancer was first a local, and not a constitutional disease. Convinced of the correctness of these views, Dr. Marcy

proceeded at once to put into practical execution the legitimate deduction, that, if cancer is a local disease, its treatment should be prompt and thorough as possible in its eradication, to be effective. This led him very early to the careful dissection of the axillary glands, and all suspicious and superfluous fatty tissue; and it has been his custom, in all cases, to dissect carefully the axillary space. Although it cannot be doubted that such radical measures add materially to the gravity and difficulty of the operation, especially as done before the days of carefully applied aseptic surgery, in his own experience he recalled but two cases during all these years where the operation had resulted fatally. This good result, however, he ascribed, in large measure, to his early adoption of Listerism, and its application in all its painstaking details. He recalled one of his first cases, operated on in 1871, where he removed a cancerous mammary gland of the right side from a young, fleshy, and otherwise healthy woman. This was not alone true cancer, as judged by himself; but the opinion was confirmed by Dr. Fitz, since Professor of Pathology. In the primary operation, the axilla bore no evidence of disease, and therefore was not opened. Three months later, however, the axillary space was filled with a mass of enlarged glands, which he dissected out very thoroughly, quite after the manner described by Dr. Warren. He had the satisfaction a few months since, of examining this patient. She has remained in good health, without the slightest impairment or discomfort in the use of the arm. More than ten years since, Dr. Marcy sent a poor woman, a coatmaker, to the Massachusetts General Hospital, for the removal of cancer of the right breast, where the glands of the axilla were also affected. She was refused admission because of the advanced stage of the disease, rendering, in the judgment of the surgeons in charge, the operation ill-advised. Assisted by his friend, Dr. T. H. Burchard, of New York city, at that time his guest, they made the dissection complete. Although he has twice since removed recurrent glands, when seen quite recently, she was still earning a livelihood with her needle. At the hospital, Dr. Marcy recently removed recurrent cancerous glands from a patient from whom he had removed a cancerous breast six years ago. In the primary operation he was assisted by Dr. W. H. Baker.

During these years she had had no discomfort. Although these illustrative cases are the exception, they stand for a class of accepted cures, and teach the advantage of early radical treatment. Dr. Marcy was assured that Dr. Warren had given expression to the opinions of a large class of modern surgeons, which views, he was glad to believe, would early be accepted by both physician and patient as a decided advance in the surgical treatment of this most dread disease. He heartily congratulated Dr. Warren upon his distinctive satisfactory results.

Dr. G. W. Jones asked Dr. Warren if it was dangerous to leave any fat?

Dr. Warren: The cases differ. Some are seen with little or no fat, and sometimes there are layers of fat and tissue. This is important to remove as much as possible. Dr. Warren referred to a case of cancer of the tongue that had been on the iodide of potash treatment for syphilis, and did not get well. With the canula the diagnosis of cancer was made, and the operation was performed immediately. In abdominal tumors, Dr. Warren has used the largest sized aspirating needle with suction, for the purpose of exploration. In aspirating a case of kidney tumor, we generally get only blood; but, if the material in the needle is carefully examined with the microscope, enough tissue may be found for a diagnosis.

Dr. S. N. Nelson testified to the advantage to both patient and surgeon from the possibility of accurate diagnosis of new growths before operation. Formerly it was necessary to wait until after removal before the specimen could be examined by an expert, and the verdict rendered. In the sister profession, an attempt is made to determine the *necessity* for punishment before it is inflicted. Should not we do the same? The ingenious instrument invented by Dr. Mixter opens a new era, rendering this possible. By the use of this simple device, we are enabled to procure our specimen before operation, and without injury to the patient, and subsequent procedure can be determined upon at leisure. This, it seems to me, is the greatest gain to the patient, in the possibility of obtaining proper treatment. This gain may well be compared to the advantage which the higher powers of the microscope give us over the examination of the gross specimen; for it enables us to utilize these high powers at the time when their testimony is most needed.

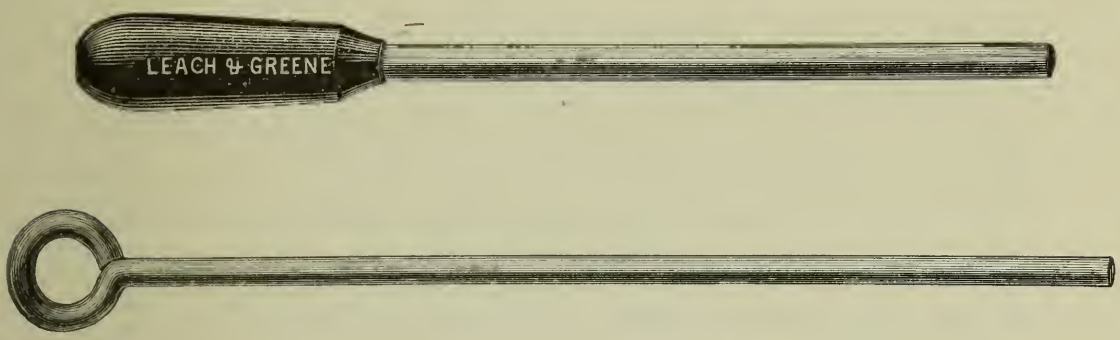
Dr. Nelson himself has been accustomed to make microscopic examinations of the cervix uteri in suspected cases, after etherization of the patient. A small piece is readily snipped off with the scissors. It is put at once upon the freezing microtome, and sections are made, which, stained in alum carmine, render possible an opinion, if not a positive diagnosis, in five minutes from the time of procuring the bit of tissue, the patient continuing in the state of anæsthesia; and then the necessary operation is at once performed. If, however, the expert, with his laboratory facilities, cannot be present at the operation, or if more time is desired for making the diagnosis, the small bit of cervical tissue can be obtained with the aid of cocaine, and, after diagnosis, the operation can be performed subsequently under ether. But I think a better specimen can be obtained for examination by Dr. Mixter's device than by the scissors, even where it is possible to use them.

A great advantage in Dr. Mixter's instrument, as it seems to me, and one not mentioned by any of the speakers, is that, by its use, there is obtained a specimen, which may be a sample of the whole new growth, even including normal healthy tissue. Thus we get not only the centre, where the pathological changes are the greatest, but also towards the edges, where they are less marked, and even the advancing borders themselves; and thus the invasion of the healthy tissue can be studied. Of this every microscopist knows the advantage.

In illustration of the use of the instrument, Dr. Warren had brought a breast which he had amputated that morning, in which the diagnosis of cancer had been established by its aid. The site of entrance of the canula a few days previously showed as a small red spot. The cylindrical specimen removed was about one and one-fourth inches long and one-eighth inch thick. One-half of it, divided longitudinally, was exhibited. From the other half, sections had been cut both longitudinally and transversely, and these, with others, were exhibited by

Dr. Wm. F. Whitney, who called attention to them as showing what good topographical sections could be obtained from one of these exploratory punchings. In view of the more extended operation now performed in cases of malignant disease, he said it

was now more than ever essential that the surgeon should know exactly the nature of the growth with which he had to deal. And, with the aid of the instrument shown by Dr. Warren, he was able to judge what he would be called upon to do before he touched his knife.



DR. MIXTER'S CANULA.

THE INDUCTION OF PREMATURE LABOR.

BY ELIZABETH C. KELLER, M.D.

OF BOSTON, MASS.

Read April 8, 1885.

THERE is perhaps no obstetrical operation which has been more severely critised than that of premature, artificial delivery; and because of the fact that leading obstetricians of all countries have disagreed on this subject, those of our day have been led to a most careful study of its practicability. According to Cazeaux, upon whose authority I have mainly relied in the hasty preparation of this paper, the induction of premature labor had its origin in England. About the year 1756, there was a consultation of the most eminent obstetricians of London on the moral bearings of this procedure, and the physical advantages to be derived from it. The first recorded case in which it was deemed advisable fell into the hands of a Dr. Macauley, and, terminating successfully, his example found many imitators in England. In Germany it was first proposed in 1799 by Mai, of Heidelberg, but was not put in practice until 1804, when Wensel reported a successful case. Since that time it has been successfully performed in Holland, Italy, Denmark, Switzerland, Poland, and America. In France, the operation was long rejected as a crime, though it was proposed as early as 1779. Different writers recommended it at various periods, until, finally, in 1831, Prof. Stoltz ventured on the operation, and, as it proved successful, doubts as to its propriety gradually disappeared, and French accoucheurs have at length very generally adopted the practice.

The operation should always have in view the double object of saving the child's life and of lessening the danger of labor to the mother,—a danger which frequently proves most serious. Whatever the conditions which may make the operation necessary, whenever compatible with the safety of the mother, it should be delayed until the fœtus is viable; in fact, if undertaken before the viability of the fœtus, it becomes not induced labor but abortion.

Every practitioner knows how rare are the cases of children born before the end of the seventh month of gestation who live and thrive. The degree of the obstruction to delivery at term must therefore guide the practitioner in choosing the time for the induction of labor, whether earlier with increased risk to the child, or later with increased risk to the mother. It is therefore necessary to determine as accurately as may be the degree of contraction of the pelvis concerned, and the length of the various diameters of the fœtal head at the seventh month of gestation. The bi-parietal diameter of the fœtal head will, in most cases, correspond to the contracted, that is, the antero-posterior, diameter of the pelvis, and will show in what degree of pelvic contraction delivery will still be possible. According to Dubois, Stoltz, and Madame Lachapelle, the bi-parietal diameter at the end of the seventh month averages $2\frac{3}{4}$ inches, a reduction of one-quarter inch being made on account of the compressibility of the head; the smallest pelvic diameter must be at least $2\frac{3}{4}$ inches. A degree of contraction exceeding this is regarded by many as affording no chance of successful delivery.

Contraction of the pelvis must not, however, be considered as the only indication for the induction of premature labor. Forced delivery was long since recommended in cases of profuse ante-partum hemorrhage, especially when due to placenta previæ. It is also recommended in cases of convulsions which resist ordinary measures, or which return with increasing severity after having been once

arrested. Cazeaux mentions cases of aggravated disease of the heart, general infiltration of the tissues, accompanied by effusions into the great cavities, threatened suffocation, and the existence of a large aneurismal tumor (liable to be ruptured from the obstruction to the general circulation caused by the developed uterus) among the conditions which are as dangerous as hemorrhage or convulsions, and which indicate premature delivery when other resources have been tried without benefit; but he advises consultation with "enlightened practitioners" before assuming such a responsibility. The same author considers vomiting which resists all therapeutic measures among the conditions which justify this operation. To this list should be added nephritis accompanied by excessive œdema, also the various kinds of tumors which often complicate pregnancy and delivery.

Interference is regarded as admissible in case of a tumor which hinders the development of the uterus, or when a tumor is so large or so fixed to the pelvic walls that it can be neither pushed above the superior strait nor drawn below the vulva. Smallness of the abdominal cavity may also make the artificial induction of labor necessary. M. Depaul gives a case of asphyxia, occurring in a rachitic woman, whose abdominal cavity had not the capacity sufficient for the development of the uterus to term. Certain nervous disorders, as chorea, violent paroxysms of asthma, etc., which do not yield to therapeutic remedies, may be met in this way. Death of the fœtus in preceding pregnancies may also justify this procedure. Certain women who reach the eighth or ninth month of gestation without the slightest disorder, suddenly find that the movements of the child diminish, and the child dies. Two such cases are mentioned by Denman, in which premature delivery was resorted to, and the life of the child saved.

Premature labor has been recommended in case of the death of the fœtus, and also when the pregnancy overruns the usual time; but in these cases, unless for some especial

reason the mother's life is endangered, a natural labor may be awaited.

The methods proposed by different operators for effecting premature labor are numerous ; all, however, are based upon the contractile power of the uterus in the expulsion of its contents. Among these methods may be mentioned, first, such measures as excite uterine contraction through their influence on the general organization, as for example tepid bathing, venesection, the administration of ergot, quinine, etc. Secondly, those depending upon the excitement of some special organ, as the mammary gland. Thirdly, those which operate directly and mechanically upon the uterus itself, for the purpose of arousing its activity. The first and second methods are too uncertain to be relied upon ; we will therefore pass at once to the consideration of agents of the third class, namely : (*a*) External stimulation of the body of the uterus. (*b*) External stimulation of the os tincæ. (*c*) Dilatation of the neck of the uterus. (*d*) Stimulants inserted between the walls of the uterus and the ovum. (*e*) Rupture of the membranes.

External stimulation by friction over the anterior wall of the abdomen and fundus of the uterus was originally recommended by Prof. D'Outrepont, to which Ritgen added titillations of the os uteri by one or more fingers introduced into the vagina,— methods found to be too feeble to bring on genuine labor, and therefore now generally rejected. Electricity was proposed and tried by Killian and by Shreiber, but, proving ineffectual, this method was abandoned. A more satisfactory means was found in the application of a stimulus to the os tincæ. This was accomplished by the tampon, the douche, or a jet of carbonic-acid gas. Hueter's method consisted in the filling of a dog's bladder with a decoction of ergot, and placing it in contact with the neck of the uterus, hoping by the ergot to aid the mechanical action of the bladder. Prof. Bush substituted for the dog's bladder that of a calf, to be withdrawn and

reinserted frequently; but this plan was also found ineffective in most cases, and soon fell into disuse. Schœller first introduced his method (the use of the tampon) in Berlin, in 1839, and he records five operations, with a living child in four of them. He recommends the use of the tampon until uterine contractions have begun, and then the use of the finger in further dilating the os uteri. This method was found to be painful, and it so often failed to produce the effect desired that it also was abandoned. Braun's process consists in the use of an air bag, known to us as the colpeurynter. This also proved unsuccessful in a large percentage of cases, and has fallen into disuse. Later the warm-water douche was introduced by Prof. Kievieck. He applied a stream of water, of a temperature of 78° Fahrenheit, to the neck of the uterus. The douche requires repetition about ten times in each case. Stoltz reports having used it in eighty-one cases, sixty-eight of which proved successful; but the remaining thirteen required more active measures to bring on the labor. Notwithstanding his success with this method, he declares that it is not without its dangers, and says, if not carefully used, may cause death. Scanzoni recommends a jet of carbonic-acid gas; but this method, on account of its great inconvenience, is not likely to come into use. Some operators endeavor to bring on contraction by keeping within the cervix a foreign body, which acts as an irritant and mechanical dilator. A prepared sponge, inserted into the cervix and held there by a tampon in the vagina, was Kluge's mode of operation. This, with friction over the abdomen, and later with titillations of the cervix, has been successful in many cases, and is still resorted to by some; but it has been found not devoid of danger to either mother or child. The sphenosyphon, invented by Schuackenberg, consists of a canula with a piston, to the end of which is attached a distensible bag of prepared skin, which when dilated has a diameter of from 1¾ to 2 inches. The canula and bag, being passed

into the cavity of the uterus, are allowed to remain there for a day; the bag is then dilated by means of a fluid which is forced into it. This is a complicated instrument, and, on that account, has not thus far been much used. In 1862, Dr. Barnes introduced his dilator, an instrument which continues to have a place in the operating case of most obstetricians at the present day,—not that it gives entire satisfaction in all cases, but it is believed to be safe, and as effectual as any of the numerous inventions of its kind. Molesworth's dilator, of more recent invention, is preferred by some. It is regarded as a safe and almost invariably an effectual means of dilating the cervix. To Hamilton is accredited the plan of detachment of the membranes by means of the finger. Others have recommended the use of a catheter or an elastic bougie for the same purpose. This plan was favorably received in England, and is much used there. Lusk speaks of it as the only one having any special claim to favor. Intra-uterine dilators and intra-uterine injections are still advocated by some. The plan of puncturing the membranes at various points has its advocates, some puncturing low, and allowing the escape of the liquor animi, others puncturing on the side high up, to allow the escape of a part only of the fluid contents. The slowness of this method, and the pressure of the contracting uterus coming directly upon the child, thus subjecting it to danger, are sufficient reasons for regarding this as a questionable procedure.

Enough of the history of the various methods for the induction of premature labor has been presented to introduce a discussion, which, it is hoped, may call out the personal experience of the members of the Society on this important obstetric operation,—experience which would doubtless be of great value to the younger members. My own personal experience in inducing premature labor is confined to five cases. The first was that of a young colored girl, to whom I was called in Philadelphia in 1871, during the first

year of my practice. The patient was suffering from what seemed to be symptoms of blood-poisoning, and there was a profuse, brown, and extremely fetid vaginal discharge. On examination, I found the uterus large, and somewhat tender to the touch. She confessed herself to be pregnant, and as I had reason to believe that the fœtus had been dead for some weeks, I thought active measures for emptying the uterus were indicated. Being anxious, however, to guard my professional reputation, I consulted Prof. Cleaveland of the Woman's Medical College of Pennsylvania. She agreed with me in the diagnosis, and advised dilatation by means of sponge tents. The first tent, of small size, was introduced in the morning about 9 o'clock, and was held in place by a tampon in the vagina. This tent was removed in the evening, and a larger one introduced. The patient was without pain till about 4 o'clock the next morning, when I was sent for, and, as I found marked labor pains, concluded to allow the tent to remain. At 6 o'clock, the entire contents of the uterus, with the tent, were expelled. The fœtus was developed to about the sixth month, and was somewhat decomposed. The uterus was washed out frequently, and the patient made a good recovery.

The second case, Mrs. C., a German woman, living in Boston, came to my office in 1884, not feeling well, and wished to place herself under my care. I very soon decided that she was pregnant, and told her so. She was greatly disturbed upon hearing this, and proceeded to tell me that she was one of three children, natives of Germany, the first of whom was born with difficulty prematurely, the labor having come on spontaneously at seven months; the second was born at seven months after a fright received by the mother. In the case of the third, the mother went the full term, and delivery being impossible on account of a small pelvis, embryotomy was resorted to, and the mother died on the second day after delivery. The sister of my patient married, and after almost losing her life in the birth of a

very small dead child at term, was advised never to bear another, "as she was too small to give birth to a living child." My patient was 34 years of age, of so small stature, and weighing only 94 pounds, that I thought best to take exact measurements, which revealed the following facts: Height, 59 inches; length from head to hips, 24½ inches; from hips to feet, 34½ inches; from sacro-vertebral angle to pubis, 3¼ inches. In view of these measurements, as well as of the family history, I concluded to consult counsel; and a premature delivery was agreed upon. At the end of eight and a half months we introduced a Molesworth's dilator of the smallest size; about eight hours later a larger one, and still later the largest, and in about thirty hours labor was well established. The membranes began to protrude, the bag of waters formed in a natural way, the head partially descended in the occipito-iliac left-anterior position. Being then arrested, the forceps were applied, and a living child, weighing a little over ten pounds, was extracted. The time occupied from the beginning of the operation to the delivery was three days. The mother did well, and the child is still living,—a large, rugged, healthy boy.

Seventeen months later I was again called upon to deliver the same woman, who had in the meantime moved some eight miles away from my office, and off the line of cars. On account of the slowness of the previous labor and the constant watching required, I was very averse to a repetition of the former procedure, and therefore decided upon the use of electricity. Gaiffe's pocket battery was selected for the experiment. When the period of gestation had reached eight months and seven days, I went with my former counsel, Dr. Berlin, who consented to act as my assistant, to the house of the patient, and found her in her usual health and spirits. At about 6 P. M. she was placed in a warm sitz bath; the negative pole of the battery was thrown into the water while the positive pole was held in the hand of the operator, and, at a signal from my assistant (who held

a watch in her hand), the circuit was completed by placing the hand on the abdomen over the uterus, where it was held during half a minute; the circuit was then broken during one minute, then again closed during half a minute, and so on for one hour, when the patient declared that she had pains. The os uteri began to feel softer; and as the uterine contractions had become quite marked under the hand, and the child's movements were rather brisk, we concluded to put our patient to bed, and await results. At 9 o'clock we repeated the former procedure, and finding the intermittent contractions continued, we waited until about 2 o'clock, A. M.; then, with a view to hurrying matters, a Molesworth's dilator was easily introduced through the dilatable os uteri and cervix. Nothing apparently being accomplished by it, however, the dilator was removed. We remained until 3.30 o'clock, A. M., and then decided to leave the patient for a while and wait. At 4.45 A. M., a call came by telephone to hasten to the patient. The distance was travelled in about an hour, and the patient found in violent pain, with the head at the inferior strait. After becoming satisfied that no further progress was being made, the forceps were applied, and at 6.15 A. M., a living child of 7½ pounds weight was extracted, thus making twelve hours for the entire operation, including the delivery. The mother and child both did well, and are in excellent health.

Mrs. C., third pregnancy. At eight and a half months I began at noon to induce labor, using the same method as before. Patient was put into a warm sitz bath; the negative pole of the battery was thrown into the water, while the positive pole was held in the hand of the operator, and the circuit was completed by placing the hand on the abdomen, over the uterus, where it was held for half a minute; then the circuit was broken for four minutes. This was continued for two hours. The patient was then put to bed. The treatment resulted in softening of the os uteri, it being then patulous enough to introduce the point of the finger.

At 12 P.M. the electricity was again applied; the negative pole direct to the back, and the positive pole (held by the operator's hand as before) applied to the abdomen over the uterus for two minutes, and then two minutes' rest, and so on for half an hour. After this, marked labor pains set in, and, four hours later, the head had engaged in the superior strait, the os uteri being completely dilated. It was decided to deliver. Ether was given, forceps applied, and delivery easily accomplished; the result being a vigorous, bright, active child. The mother made so rapid a recovery, without prostration or any discomfort, that it was favorably commented upon.

The next and last case was that of a little woman, Mrs. D., aged 24 years, weight 87 pounds, height 61½ inches, conjugate diameter 3½ inches. She was greatly troubled in mind, having had a child born in August, 1884, when forceps were tried without success, and version finally resorted to. After prolonged effort she was delivered of a large dead child, having been thirty-six hours in labor. In this, the second pregnancy, she came under my care, and I concluded to deliver her at the end of eight and a half months. This decision was made on account of the small pelvis, extreme anxiety of the patient, and the earnest desire of both herself and husband to have a living child. The same method that had been employed in the case of Mrs. C. was determined on. The same little French battery was used; an application was made for forty minutes, with one pole in the water and the other in the operator's hand, while contact was made with the other hand, as in the previous case, at short intervals. The effect of the application was, as before, to excite contraction of the uterine muscle under the hand, and to soften the os uteri. In half an hour the application was repeated for forty minutes, when the cervix was found to be slightly shortened, soft, and somewhat dilatable. At 2 o'clock, A.M., there was an inch of dilatation, and the membranes were beginning to protrude. The pains were inter-

mittent, and, though trifling in character, proved by the effect produced to be true labor pains. At 2.30, A.M., a Molesworth's dilator was used, with the result of somewhat increasing the pains both in frequency and severity. These continued until 3 P.M. of the same day, when the patient, without further interference, was delivered of a living child, a little under five pounds in weight, which is now over two weeks old. Both mother and child are doing well.

From observations made upon these two cases, we have been impressed with the following features of the labor. 1. The prompt beginning of the first stage of labor, and the even, quiet, painless way in which dilatation was effected. 2. The brevity of the second stage. 3. The easy and prompt termination of the third stage. 4. The shortness and comfort of the lying-in period. The cases cited in which labor has seemingly been induced by the application of the interrupted current are few, and the results are, perhaps, without much weight to many of my listeners; but these cases have made no small impression upon those of us who have witnessed them, and we are at least disposed to continue our experiments in the use of the interrupted current as a means of inducing premature labor, when this end in view is indicated.

DISCUSSION.

DR. WARNER asked if Dr. Keller would proceed in the same way in placenta prævia?

DR. KELLER, in reply, said that these means might be insufficient in such an emergency, and that plugging the cervix would be necessary.

DR. S. C. GORDON cited the following case, and asked the opinion of the Society as to the best time to induce labor. Patient had had three pregnancies. At first pregnancy the child was born prematurely at seven months, and died. At second pregnancy she went to term, and was delivered by craniotomy. When pregnant for the third time, Dr. Gordon was consulted, and decided upon inducing labor at eighth month. The exact date of concep-

tion was doubtful, on account of a slight hemorrhage during the early weeks of supposed pregnancy. Labor was induced at what was supposed to be the eighth month, but the fœtus proved to be one of seven months, and died. Patient is now pregnant, and the exact date of conception is known. It has been decided to induce labor at the eighth month. There is no deformity of pelvis; but it is small, and the child's head is solid and hard.

Dr. Keller would induce labor in such a case at eighth month.

Dr. A. L. Norris would not wait later than the eighth month, and thought that earlier interference might be necessary.

Dr. Esther Hawkes suggested that in such a case, where trouble arose from the firmly ossified head, a trial should be made of special diet. Dr. Hawkes described a case in point of a lady forty-three years old, who was pregnant for the first time. Great fears were entertained of a difficult and dangerous delivery at term. A diet consisting principally of fruit and vegetables was ordered. An eight and a half months baby was born at term, without much difficulty.

Dr. W. Symington Brown considered the paper an admirable one, and inquired how Dr. Keller was able to decide so accurately upon the date of conception? In Dr. Gordon's case he would induce labor at an earlier date than the eighth month, as there is no great difficulty in saving a seven months' child. Dr. Brown narrated a case where craniotomy was thought necessary, but where he delivered by means of Charriere's forceps. By means of these forceps the fœtal head can be compressed, and such compression will do no harm if done gradually.

THE ANIMAL SUTURE.

BY F. L. BURT, M.D.,

OF BOSTON, MASS.

Read by title, Feb. 14, 1889.

THE suture is a necessity universally recognized in the practice of surgery. All are agreed as to the use of some kind of suture; but there is not the same unity of feeling in regard to the kind of material to be used. Differences of opinion also prevail as to the proper or best method for the preparation of the same. It has been my fortune to use sutures of all varieties, many of which I could procure in the shops, prepared much as I desired them, and very satisfactory in their use; but in none of the various kinds and qualities of animal ligature so obtained, which will be considered in this paper, could I acquire any confidence; and the results of its use were such as to frequently cause suppuration, and prevent the healing by first intention, which was sought.

Communicating with different surgeons concerning their own use of sutures, and as to their success in obtaining such an article as they desired, the verdict has been invariably the same; viz., no perfectly reliable preparation had been found, each kind being in some way defective. Some stated that they had given up the use of animal ligatures, in many instances, because of their inability to procure suitable material. It was very evident that what was required was a ligature, neatly prepared and preserved, perfectly aseptic, and always ready for use, suitable for general hospital use, and portable withal, so as to be of service for private practice.

Each firm dealing in surgeons' supplies has its own article prepared by themselves, or for them. Every kind

which I have yet seen has proved to me to be unsatisfactory, for the following reasons: The raw material used is mostly of poor quality, and not of uniform strength. Sufficiently strong at some points, it will be found very weak at others, and consequently would be liable to break at a critical moment.

If made by any tanning process, all parts will not be found to be equally stained; the contents of different bottles will vary from a very light to a very dark color, without reference to size; whereas, all should be of the same color, — especially different portions of the same piece, — unless a part be varied a little by deeper staining, in order to resist absorption, for a few days longer. The article may be found to be harsh and non-pliable, consequently difficult to tie; and, if an artery is ligated with it, there is no certainty that it will not drop off, and be the cause of secondary hæmorrhage. The same has happened to ligated bleeding points in the abdominal cavity. Again, most preparations are preserved in carbolic oil, carbolic acid, and linseed oil, usually 1 to 5. In this the ligature becomes soaked, and in such a condition is imbedded in the tissues; or, after a short soaking in some antiseptic solution, which generally does not remove much of the oil, it is considered ready for use. This strength of acid seems to me to be too great, and likely to be irritating to the tissues. It takes considerable care to keep it as it should be, and the oil makes it very dirty to handle, and rather unsatisfactory to carry about. Finally, cases have been noted in which there were unfavorable results, which seemed to be directly traceable to the ligature as a cause.

Much of the material now in use is prepared after the formula of Prof. Lister, large quantities of which are imported from Macfarland & Co., of Edinburgh. Some of the text-books — the recent ones — have introduced a formula for the preparation of catgut, and I will quote the following from Wyeth's Text-Book on Surgery: "MacEwen has intro-

duced a chromic-acid catgut ligature, which resists absorption much longer than juniper or alcohol gut. His method is: Chromic acid, 1 part; water, 5 parts (by weight). To one part of this solution add twenty parts of glycerine, and allow the violin strings to remain immersed for seven or eight months. They are then preserved in carbolic acid, one part, to glycerine, ten (1 to 10). Thus prepared, catgut will resist absorption from twenty to sixty days."

I have samples of gut prepared after this formula. As will be noticed, the proportion of chromic acid is as 1 to 25. Since this is a glycerine solution, it probably does not give up so much acid to the gut as would the same strength of a watery solution; but that there has been considerable tanning process effected is seen from the deep maroon color, and were it not that it has been in the glycerine it would be less pliable and much tougher than the strongest of sole leather. I have preparations also of some gut which has been through a watery solution of the same strength for one day, part of which is preserved in carbolic glycerine, and a part kept dry. Another quantity was made with the same strength of chromic acid in $\frac{1}{20}$ carbolic acid. This makes a very dark, muddy mixture, and the character of the gut is changed accordingly; whereas the solution in clear water is a brilliant red, and it produces the maroon-colored gut. It is very evident that the gut will be colored in proportion to the strength of the solution, and according as to whether it is in a watery or oily solution. It will also make a great deal of difference in regard to how much tendon there should be placed in a given quantity of chromic-acid solution, ʒss of catgut placed in ℥iv of the strong solution takes its fill of chromic acid, yet does not change the color of the solution.

There are great objections to any material prepared with such formula. Chromic acid is a caustic; and in such quantity is certainly of too great strength for the tissues. The tendon will be too hard, not pliable, and will tie with

difficulty, and usually will not hold a knot. Made, as it is, to resist absorption from three to eight weeks, our object will likely be defeated, since, wishing healing by first intention, which will take place within a week, if at all, we will expect non-union because of the presence of a material not absorbent, which will act as a foreign body. From one to three weeks is the longest time that it is desirable to have a tendon hold. If more strength is necessary, other materials, as silk, silk-worm gut, or wire, had better be used.

After trying in vain to procure satisfactory ready-made goods, I purchased a quantity of raw gut, and undertook the preparation of it, starting with the following formula, which I understand to be that of Prof. Lister: —

℞	Acidi Chromici . . .	gr. ii.
	Acidi Carbolici . . .	ʒ vi, ℈ i.
	Aquæ . . .	℥ xvi, ʒ vi.

In other words, this is a 1 to 4,000 solution of chromic acid in a 1 to 20 carbolic, the chromic acid being added to the other solution. Ligatures are allowed to soak in this for forty-eight hours, after which they are removed and thoroughly dried; then placed in a 1 to 5 solution of carbolic acid in linseed oil, in which they remain immersed till wanted for use.

I have used this formula, varying it by thousands, from 1 to 1,000 to 1 to 6,000 chromic acid. Those different proportions will produce very different grades of ligature, varying from one easily and quickly absorbable to one which will be absorbed with great difficulty, and take too long a time. It being somewhat uncertain as to the exact strength of solution, unless great care is taken and with very sensitive scales, which may not be at hand, I finally gave up weighing entirely, and depended upon the sense of sight to determine the proper color of my solution. However others may wish to do this, it will be found that the most satisfactory

strength is not more than 1 to 5,000 nor less than 1 to 6,000 chromic acid, in a 1 to 20 aqueous solution of carbolic acid.

The ligature, when prepared, should represent the same shade as the original solution, and the common amber most nearly represents the color. In order to obtain this, I found it necessary to watch the process, and that the forty-eight hours, or any other stated time, would not answer.

At the end of four to six hours it is usually sufficiently done. It had better be begun in the morning, since daylight is necessary to distinguish the yellow; and if the staining process has not gone far enough before dark, the solution had better be reduced somewhat in strength of chromic acid only, and then left over night, or the ligatures can be removed and dried, and immersed the following day. When it has remained sufficiently long, remove it and dry thoroughly.

In this condition it is placed in bottles, sealed if desired, and is always ready for use, needing no preparation, except to be soaked in $\frac{1}{20}$ carbolic acid or $\frac{1}{1000}$ sublimate solution from the beginning of the operation till needed, or, say, one-half hour. The most satisfactory method is to immerse the gut in the weakest solution, curing it slowly and evenly and gradually, adding strength of chromic acid, if necessary. I would suggest to those who prefer to prepare their own ligatures, that one or more trials be made with single small pieces till sufficient experience is acquired, and then it could be prepared in quantities suitable for months or years of work.

Any tendon can be prepared in this manner. The different kinds are the following: kangaroo, moose, whale, deer, fox, squirrel, catgut. The squirrel is a choice tendon, and can be split into very fine pieces without fraying, but it is too short for general use. The whale or moose answers very well sometimes, and I have seen very fine results after their use; but their fibres are arranged diagonally, and consequently cannot be split up into long fine strips. The

kangaroo tendon makes a fine ligature, and would be frequently used if it could be easily obtained in large quantity. Catgut, on the other hand, is cheap, always at hand, and very satisfactory; consequently I have prepared it, and used it almost exclusively. A kind sold by dealers in clock materials, put up in coils from fourteen to sixteen feet in length, I have found very nice. It has worked just as well as the violin string, and the cost is very much less. The retail price is seventy-five cents to one dollar and fifty cents per dozen coils. I remove the red thread from the coil and cut each one into eight lengths, which will be found suitable for any operation. These short pieces are put to soak, so as to avoid the knotting. When whole bunches are prepared in one piece, it would be very injurious to the gut to try to straighten it. These pieces, when done, are coiled or kept straight, as desired, and are put away in the dry state in bottles, and they will be found to be neat, perfectly satisfactory in their results, and always ready for use. This ligature will be found to have the following advantages: —

1. It is soft and pliable, and holds a knot.
2. It is dry and clean, without solution of oil, and, therefore,
3. Portable, without danger of soiling articles in contact.
4. It is perfectly aseptic.
5. It is always ready for use.
6. It has proved entirely satisfactory in its results.

At various times, when preparing the sutures, surgeons from different sections of the country have been present to witness the process of making, its use in surgery, and its results. Most of these were men who, not having had the best results with the kind they had employed, were consequently more or less adverse to its use, but yet were desirous of employing it if a suitable article could be found. Prof. W. J. Gillette, of Ohio, told me that in his experience and that of other Western surgeons the results had been unfavorable; the gut obtainable being harsh, brittle, incapable of holding a knot, and otherwise unsatisfactory.

In this connection I wish to mention a few other varieties: With the alcohol or juniper-oil* preparations I have had very little experience. There is no need to criticise them, since they are used by many very able surgeons, doubtless with excellent results. It would seem necessary, however, to watch them, lest in alcohol they become too hard, or in juniper oil they become too soft. These conditions, together with the fact that I have endeavored to discard all preservative solutions entirely, would lead me to recommend the method herein advocated.

Since working in this field, there has come to my notice an article, put up in coils and dried, said to be produced from a formula of Prof. Lister. I should judge it to be an excellent thing, if only it is carefully prepared from good material. It is called sulpho-carbolized gut. The coils I have seen have been made from an imperfect gut, and I have had no proper ones to use to test their virtues.

It has been asked: Why go through this preparatory process? Why not just as well use a raw violin string? This has been done, and no doubt can be done with good results. The violin string costs very much more, and is no better than the gut here recommended. This would be an item of some importance in case a large quantity were to be used. Where any kind of gut is employed, it is far better to prepare it in the antiseptic and tanning solution, than to bury in the tissues a gut which has been no one knows where, bearing any possible disease germ, and with nothing done to it more than a short, probably insufficient, soaking previous to its use.

In this paper it is not necessary to go into any lengthy description of the uses of catgut ligatures, as this has been ably and sufficiently done; but since this gut has produced such good results, it seems but fitting to say a few words in respect to the operations in which it has been used.

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* Eight days in aqueous sublimate solution 1 to 1,000; then preserved in juniper oil. Martin, "Pathology and Therapeutics of the Diseases of Women," p. 150, American edition.

It is of the greatest use as a buried suture. In this place it always holds sufficiently long for union, if healing by first intention is to take place at all, becoming absorbed or organized early, and never again being heard from.

Its most frequent use as such is in abdominal surgery, operations for hernia, and in the perineum; also all surgery where subcutaneous suturing is required. It can be well employed in all the cavities of the body for approximating the surfaces of mucous membrane, peritoneum, muscles or sheaths, or tissues of any organs. In abdominal surgery, it ligates bleeding points; can be used to tie off the pedicle in all cases without fear of trouble, and with any knot desired. It works admirably for the Tait knot on small pedicles, and with the shoemaker stitch on the larger ones.

In the abdominal wound it is well to unite separately the peritoneum, fascia of the muscles, and other tissues, so as to prevent pockets or a subsequent hernia. The deep tissues and skin are best drawn together with silk or silkworm gut, but approximating the skin surfaces with an overcasting of fine continuous catgut. When the silk is removed, the overcastings of gut will easily rub off. For uniting a skin wound, the catgut as a continuous suture is evidently not the most satisfactory. The same, however, may be said of any material if the continuous suture is used. What seems to produce the best results is interrupted silk, perhaps three to the inch, and overcast with fine gut if necessary, to approximate the edges of the skin carefully.

It can be used to great advantage in anterior colporrhaphy, and at times on the cervix; but as a continuous suture for the latter it is not so satisfactory as the interrupted silk suture.

Of especial importance is its use in the restoration of the perineum. The operation is not satisfactory unless a good perineal body is formed. This cannot be done by the ordinary external suturing; but it can be, and perhaps in no

better way, by approximating broad surfaces by the catgut suture subcutaneously.

Since it will tie and hold well, it can be used to advantage for an interrupted suture at any part, especially if there is not too much straining or maceration of the knot. There is no objection whatever to its use as a continuous suture, except that it almost invariably is drawn too tight, thereby causing more or less strangulation of the enclosed tissues, and not properly approximating the skin surfaces throughout.

As to its use for the shoemaker stitch, it can be applied to many parts under various circumstances. Especially applicable, however, is it in three places: the intra-abdominal stump or broad pedicle, the radical operation for hernia, and extirpation of hæmorrhoids. The suture can be passed by two needles, each end threaded, or with a single needle, unthreading and threading at each puncture of the tissues. This should be drawn just tight enough to prevent hemorrhage, but not sufficiently to produce sloughing. This might make no difference in the abdominal pedicle in which the amount of tissue beyond the ligature was very slight, nor would it often in the operation for hæmorrhoids, for the same reason; but in the hernia operation such an amount of tightening of the ligature as to stop the circulation entirely will invariably cause some sloughing, perhaps some opening of the wound, and prevent proper healing of the incision.

There is a tendency generally to use too large gut. The sizes should vary for different purposes, and should be from the smallest obtainable, perhaps .225 millimetre in diameter to 1 or 1.5 millimetre. Seldom will a gut larger than the "E" violin string be required. It is best not to bury any more gut in the tissues than is required to promote their proper union.

Finally, adding what I learn to have been the experience of many surgeons to the mite of my own experience, it seems to me that we can come to but one conclusion, viz.: the

operator is responsible for the results of his work, consequently he should know the nature of all the materials used. If he desires animal sutures, and cannot purchase a reliable article, he should make them himself, or superintend their preparation. The manufacturer cannot be the responsible party; and the use of any gut which is made simply for sale, and not conscientiously prepared, may cause the operator a great deal of anxiety after its use. It seems almost unnecessary to state that the surgeon should exercise full as much care in this regard as is usual in the preparation of instruments, sponges, etc., for intra-abdominal surgery.

SPECIALISTS AND ESPECIALISTS.

BY W. SYMINGTON BROWN, M.D.,

OF BOSTON, MASS.

Read, April 12, 1888.

DURING the last fifty years great scientific progress has been made in two apparently opposite directions,— differentiation and unification. Writers like Agassiz, Darwin, and Huxley have not only pointed out the progressive steps through which plants and animals have arrived at their present diversity, but have also demonstrated the absolute unity which binds the whole universe together. Scientists have discarded as untenable the old notion of creation by a series of fits and starts, and perceive that the process is, and always has been, one of steady, gradual evolution.

This is true of the so-called physical sciences. It has been satisfactorily proven that they all stand in an intimate relation to one another: to fully understand one, we must also know something about the rest. An anatomist who knows nothing about mechanical forces, or a botanist ignorant of chemistry, would stand small chance of distinction in these branches. And the same remark applies to the different departments in our profession. I can recollect the time when there were only two divisions — physicians and surgeons — and, except in large cities, only one,—the doctor or general practitioner. But in our day we have oculists, aurists, alienists, gynecologists, obstetricians, dermatologists, laryngologists, lithotomists, orthopedic surgeons, electricians, dipsomania managers, lung doctors, rectal surgeons, cancer curers, syphilis and gonorrhea specialists, etc.,—in fact, nearly every region, except the umbilicus, has its corps of trained or ignorant specialists; by and by, perhaps, that

neglected *cul-de-sac* may also be attended to. There must surely be some utility in all this subdivision; but I suspect that the old method of attacking disease in single file has also its own advantages. In assailing corners of disordered or diseased humanity, we are apt to forget that the human frame is a unit, each part of which sympathizes with every other part, from head to foot.

To make a skilful specialist, therefore, we must first create a moderately good general practitioner. It is true that no single man or woman can learn all that is known about the art of therapeutics. Admirable Crichtons are not reproduced in our age any more than Shakespeares; but, to succeed as a specialist, one should at least go through its primary school. Several years ago, one of our best aurists told me about a case which fairly puzzled him. His patient, a woman, complained of severe, persistent earache. Careful examination failed to detect any local cause for the pain, and all his remedies proved unavailing. He finally sent her to a Boston gynecologist, who found disease of the cervix uteri, and promptly cured the earache by allaying the uterine inflammation.

From the very nature of their position and training, specialists are apt to ride hobbies. For example: Dr. Graily Hewitt, of London, seems to think that all the ills woman is heir to depend on uterine displacements; and Dr. Noeggerath, of New York, makes out gonorrhea to be the father of most of them. It would be safe to say, however, that many displacements occur which apparently do no harm, and that venereal diseases are not quite so prevalent as certain specialists suppose them to be.

Everybody, I presume, knows what is meant by the word "specialist." I define it as a medical practitioner who, under ordinary circumstances, confines himself exclusively to one branch of our art. For example, Sir Spencer Wells is a gynecologist; he might almost be called an ovariotomist: but he was a distinguished army surgeon during the

Crimean war, and on one occasion, at a place where no oculist was within easy reach, he successfully operated for cataract.

An especialist, on the other hand, is a practitioner who, while he devotes a large portion of his time to some specialty, is also engaged in general practice. The word is not as well known or as much in use as the other, but, in my opinion, it is likely to become more so. As far as I have been able to ascertain, the great majority of the active members in our society are especialists. I do not intend to bring forward this fact as a proof in favor of especialism : for the majority is sometimes wrong, and minorities even are not infallible. Let us briefly examine this subject, with at least an attempt at judicial fairness.

If we take into account the shortness of human life, there can be no doubt that the specialist possesses an immense advantage over the ordinary physician in the thoroughness with which he may study his department. A conscientious microscopist, like Virchow, may acquire a knowledge of minute pathology quite out of the reach of the country doctor. The specialist, at the outset of his career, has the necessary time for study ; and, after he has acquired a lucrative practice, the love of learning may spur him on, and increase of skill improve his powers of observation. The general public and the whole profession reap a portion of the reward resulting from his researches.

But, as a general rule, very few men are qualified to enter this field. Specialists, like poets, are born, not made. I have come to the conclusion that especialism would fit more medical workers than specialism. In examining such questions we should never forget that the cardinal principle of medical practice (constituting our right to be) is the welfare of the patient. That is the main goal we aim to reach ; if not, we have no claim to the title of physician. All methods involving a subdivision of labor should be tried by this standard, Do they promote the patient's welfare ? The chief question between specialists and especialists is

not, as Dr. H. R. Storer alleges, whether the latter more than the former encroach on the incomes of general practitioners. What if they do? That was an incisive remark of Dr. Cotting, and likely to become classical, when he lately said that the practice of medicine is the meanest of trades and the noblest of professions. This hits the nail on the head, and drives it home. I am sorry to admit that some regular physicians, from whom better things might have been expected, seem inclined to lower our worthy profession to the trade level; but they will only lower themselves in public estimation.

Recognizing this great cardinal principle, doctors need have no great difficulty in deciding whether to recommend a specialist or an especialist to the patient. That will probably depend mainly on two points: first, the obscurity or importance of the case, and, second, the ability of the patient to leave home and pay a high fee. Some time ago I wrote a short paper advocating the establishment of village hospitals. These two agencies — especialism and village hospitals — readily dovetail into each other. According to that plan, nearly every village of five thousand inhabitants, or even less, would contain one or two physicians who had devoted especial attention to diseases of the eye, obstetrics, surgery, or diseases of women. It is evident that, if some such arrangements were made, ready access to superior skill, at a minimum of expense, would be better secured than at present.

One of the worst features of ultra specialism is that it converts so many poor people into paupers, to say nothing about the pauperizing of some who are not poor at all, but only mean and selfish. Lecturers at clinical schools and post-graduate dispensaries, if they can only manage to secure a good case for illustration, are too often regardless of the fact that they are furnishing medical or surgical treatment gratuitously to patients who are well

able to pay a moderate fee to some young, struggling physician. In country towns the status of a patient is easily ascertained, and this form of beggary would scarcely be attempted.

Then, again, I believe that the spread and encouragement of especialism would better harmonize with the present healthful trend toward more careful constitutional treatment. Medicine has its fashions as well as millinery. To-day the fashion is setting toward common-sense. Our valued co-workers, Prof. H. M. Field and Dr. Warner, long ago pointed out the great importance of attending to constitutional remedies in treating the diseases peculiar to women. I hope that we have at length reached high-tide of the surgical flood, and that the ebb has begun. Of course I have nothing to say against conservative, rational surgery. I have always been more of a surgeon than a physician. But "facts are stubborn chiels that winna ding," and loudly proclaim the supreme importance of attending to the general health, while we at the same time treat local affections surgically. It is evident that a practitioner not wholly cut off from general practice — an especialist — is more likely to pay due attention to the chylopoetic viscera, the urinary apparatus, the state of the skin, etc., than a mere specialist who is so absorbed in his own one idea that he is apt to forget the fundamental doctrine of unification itself.

A few months ago we discussed the albuminuria of pregnancy. A pure obstetrician, however skilful he might be in applying Tarnier's forceps, who was incompetent to examine the patient's urine chemically or microscopically, who had paid so little attention to diet as to forget the relation between rich, azotized food and the crippled kidneys, who had almost a contempt for common cleanliness — such a man might be able to puzzle the most of us with a learned disquisition on rare abnormal presentations, but he could

not hold a candle to some poor country doctor whom horny-fisted experience had compelled to take cognizance of all these side agencies, and who at an early period of his career had found out that, to win the battle of life, one must possess a general knowledge of both the enemy's position and his own.

A FEW OF THE ERRORS AND MISAPPREHENSIONS
Of My Earlier Gynecological Practice.

BY HENRY M. FIELD, M.D.,

OF NEWTON, MASS.

Read April 11, 1889.

PREFATORY NOTE.—As the following paper is by acknowledgment in the line of auricular confession, vouchsafed within the bosom of the Society,—a sort of thesis having for motive and product the developments of specified *meæ culpæ*,—I shall be under no stress to escape a frequent iteration of the first personal pronoun, and shall not avail myself of the substitutive synonyms often thought convenient and largely employed, through an exercise of linguistic gymnastics, by many modern writers. For "*the editorial we*" I have little respect, and shall the more carefully avoid the word as it might seem to assume the concurrence of my hearers in statements which I rather fear they may be disposed to repudiate. My assertions are as individual in responsibility as in origin, and claim no other support than such as may accrue from an experience of twenty-five years in the specialty.

When I was a student of medicine, not far from thirty years ago, it was my privilege to recognize in my preceptor a man of more than national reputation,—to whom my personal relations, I may be permitted to add, through a kindly and progressive growth, were no long period in suggesting resemblance to the nearer and affectionate relation of father and son,—a man who was among the first of the profession to associate name and fame with that department in medicine to the culture of which our Society is devoted. His gynecological practice, then already large, steadily grew

upon his hands; but to the end of life it presented the characteristics of an *especialty*, as our own Storer has defined the word; for the doctor cultivated a select and lucrative family practice also. Practical gynecology has much changed since that earlier day. Its surgical domain and service have become so much extended as at times to threaten an overshadowing of its every other function. Those who, in the time of my pupilage, were privileged to observe somewhat of the office practice and to follow the hospital and dispensary practice of my preceptor, saw little of surgery, except as he might apply the scarificator to a turgid os. None the less, he was an expert general surgeon, a lover of practical surgical work. He was among the first, and for his day one of the most successful, of ovariotomists; still, with this concession also, aside from an operation for removal of a dropsical or otherwise diseased ovary, he seldom recognized an occasion for use of the knife in his treatment of the diseases of women.

Therefore it was from the beginning of my student career, emphatically from the beginning of my medical career, that my attention was directed to the claims and the high relative value of our specialty. Whatever my preceptor had chosen as his own especial department in medical practice must be particularly worthy of choice and ennobling to its successful executive: thus I thought, with the enthusiasm which every student should hold towards his master; and the quarter of a century since passed has offered no valid ground for change of opinion. Whatever errors I may have since committed, I have never felt myself wrong in giving special prominence to gynecology; furthermore, I still believe myself wise in having followed in the path of my preceptor, and associated labor and study in this department with the interests of a general family practice.

Before I present specifications respecting the absolute faults committed, while I was still young in the profession, in the department of woman's diseases, the order as regards

time demands allusion to an error realized and corrected, fortunately for my patients, while my service was still so limited that I had not had much chance to do mischief; an error common enough among the profession years ago, in which were implicated and which had the indorsement of some who enjoyed general recognition for ability; but the results of which, now and then, were worthy to rank among acts of malpractice.

Whatever may have led my preceptor, in his own earlier gynecologic experience and in the epoch corresponding to my pupilage, to the selection of Nitrate of Silver as a chief (almost the sole) material for more positive applications made to whatever portion of the utero-vaginal canal, I never knew. It could not have been authority, for there were hardly then extant books, or even monographs, giving authoritative instruction in the specialty. Perhaps it was analogy, his observation of effects produced by like applications upon other tracts of the mucous surface. Again, quite likely, the enthusiastic representations of his personal friend, Dr. Horace Green, may have had a share of influence, conveyed while the latter occupied the high summit of renown which was gained by his vigorous argentine assaults upon the larnyx. With my preceptor, however, and whatever may have induced such action, early in the sixties it was resort to Nitrate of Silver almost every time, as conveyed through the Fergusson speculum. Such variety as attended this practice lay in the strength of the application, — a solution of varying per cent. being devoted to varying conditions, — while the privilege of the solid stick was reserved for special occasions, which implied, none the less, a not infrequent thrust quite up to the fundus uteri.

As a result of constant handling of this strong, indelible salt, the end of the index finger (including the entire nail and the tissues nearly down to the first joint) was stained with a uniformly blue-black color throughout the year. The intensity of this color might lighten a little, the outgrowing

nail might show a proximal narrow zone of whiteness, once annually, corresponding to the six weeks' absence from the city and the lecture-course given in a New-England Medical College; still even in such vacation, and in the country, the doctor kept his hand in, — or, rather the caustic stick in his hand, — as was required by attention to a considerable uterine clientele, which he cultivated and which his reputation drew to him, although so far from home.

But I had hardly begun practice for myself when I found what Nitrate of Silver was doing, as applied by the average practitioner, who aspired also to the name and work of specialist in female diseases. My own index nail could not long have been stained (and I can recall a brief period when I looked upon such stain as an honorable mark of service) before I made this discovery; although I hasten to say that I had never seen reprehensible sequential lesions in the practice of my preceptor. He was far too astute, observant, and conscientious as a practitioner to permit, at least a frequent, repetition of such mischief; and still I cannot believe that even his patients escaped it altogether, considering the extent of his practice, the length of time he used the reagent, and the avoirdupois weight of the drug which must have been converted into silver-albuminate before he laid it aside. But he was also too astute, had evidence of mischievous action presented, to permit communication of this evidence to any one else. It was rather the patient who had been treated elsewhere, quite likely by a specialist with claims to some distinction, who afforded, all unconsciously to herself, demonstration of what the silver stick could accomplish, when applied unguardedly; or, rather, when used with a lack of the utmost caution and circumspection. The uterus quite likely was out of line,— this done by the doctor, and not by disease,— and bound in this false position by cartilaginous bands of neoplastic tissue, with an abundance of associated ribbons and ropes and strands of hetero-plastic

material, all contributing to the production of an intra-vaginal anatomy such as Nature had never contemplated, and which Nature could neither remove nor turn to any profitable account. It required but one demonstration like this, and association with its procuring cause, to convince me that silver nitrate was a dangerous and often an unmanageable agency for purposes of topical use, and that it must give place to something more subject to control.

The first unqualified error of my early practice, or that which should stand first in the present enumeration, was the too frequent, indifferent (and in a word the avoidable) use *of the speculum*, whether on occasion of first exploration, for purpose chiefly of diagnosis, or, more likely, and certainly more often, as an instrument of convenience in local treatment. In my earlier years, it used to be the most frequent, I am quite sure at least it used to be the most strongly put, of all objections urged by the patient against local exploration or subsequent local treatment, that an instrument, at once offensive and believed to be inevitable, would be employed. Perhaps it will be objected that I was too ready to detect such discontent, to listen to complaints made against the speculum; that I gave them undue weight, and was hasty in dispensing with the aid of an instrument held by many of our most active experts to be alike indispensable and invaluable. But, again, after some experience with its general non-use, may I not have been in a position to realize, as some of my confreres do not, how frequent and earnest is the patient's adverse sentiment in this direction? The objection to the speculum, once I had seriously considered it, was obvious as never before; and yet it might never have become obvious so long as I had continued to use it, so to say, by a kind of routine in every case that sought my advice. Under these circumstances, the very obviousness of its offence, from the patient's point of view, would be calculated to render her hesitant in protest.

Through the many years that I have largely dispensed

with this common aid in diagnosis and treatment, I have received frequent and grateful recognition of this feature of my practice, and such as I must believe could not but surprise some physicians who practise by another method. Its employment requires a lifting of the skirts, a suggestion and a measure also of personal exposure, a raising of window-curtains, and a display of parts at all other times consecrated to privacy, the thought of which would never have been entertained had not the aid of vision been called in for purpose of diagnosis or of direction of topical applications. Such patients as possess delicate sensibilities receive the deeper wound to delicacy; and this very quality renders less probable the protest that might have averted the provocation. If, again, she happen to be a representative of the subject (seldom encountered, it is true) who is at once pure-minded and physically inflammable, responsive to continuous local pressure, distension and titillation, she is the last to confess such peculiarity of organization by word or sign, although she should be the one above all demanding gynecological treatment to be spared the physiological outrage.

Reflection soon led me to see that it was because of a twofold function of service that the speculum was valued by those who constantly use it; a function answering, as already said, to the occasion of primal exploration for diagnosis, and to subsequent convenience in pursuit of treatment. Its first office, then, is as an aid to vision, that the diagnostician may view such of the internal parts as are thus disclosed, and as are, supposably, the seat of disease. But surely our near neighbor in medical specialism, the obstetrician, rarely brings to his aid the resource of ocular inspection; and if the rarely encountered, the perplexing problem of fœtal presentation can be studied in all its details and solved by what I may call finger-vision, we can do as much in our domain; for we would hardly claim situations of greater difficulty, nor would we confess to a less degree of skill, than our neighbor's. I should feel it almost an offence, in this pres-

ence, should I go beyond mere allusion to the familiar phenomena which constantly follow upon the education calculated to impart to the finger selected for a special service *the erudite touch.* What physician of experience, if he had his option, would hesitate between finger-vision and ocular vision in the introduction of the female catheter? We even read through the educated finger distinctions of color presented by the uterine os; that is, we recognize the healthy os by feel, and readily distinguish by touch the pallid and anæmic prominence and that which is the seat of either venous or arterial stasis.

Permit, in conclusion, a brief personal reference: it may possibly have a passing interest for some who share with me in the experience. More than once a patient examined in the past, and who was an object of brief past treatment, upon return after an interval of months, or after a still longer period, fails to impress my memory with her case, by whatever remark or external personal characteristic; but on vaginal examination, exploration of the cervix quite likely, some slight individual local peculiarity at once stimulates recollection, and the entire case is recalled.

But the second function of the speculum, its most frequent and valued service, is as an adjunct of local treatment; with many gynecologists, as I believe, an aid by way of routine, a well-nigh inevitable attendant upon all occasions of topical application, made to whatever portion of the utero-vaginal canal. Its purpose, of course, is chiefly to serve as a large canula, through which the medicated cotton, for example, may be passed without contact with the vaginal walls on the way, and without loss or dilution, through admixture with vaginal mucus, of the medicament, the destined action of which is higher up.

In my own experience, certainly, I found that at least four times out of five the speculum, in its daily use, met such indication as this; and I came at length to realize that in nearly or quite equal ratio of cases the instrument might

be set aside *if it were but feasible to use an effective shielded applicator.* This as respects my early experience. When I had once acquired, and become familiar with, the use and value of the latter resource, the speculum grew to be still less a measure of necessity. For the shielded applicator of which I was in need, I looked confidently in the market, and my surprise was great when finally forced to believe, what all instrument makers agreed in saying, that no such applicator had ever been made and offered for sale, — at least in a simple, convenient, and serviceable form. But Codman & Shurtleff appeared at once to realize the situation, and soon provided me with what answered to my specifications, with what has never since been absent from my gynecological bag, and what from that day, of all other instruments, I have used most often, excepting only the Simpson sound. I may add, that a duplicate was early sent to my preceptor, who acknowledged its originality, conceded in strong terms its practical value, — indeed its not infrequent necessity; and thereafter, as I sincerely believe, dispensed with its use altogether. This response, as I am about casually to show, was the beginning of an experience which has presented little variation ever since! But perhaps I could not have expected other reception from one who had already abundant instrumental resources of his own, and such as he considered best adapted to the methods long followed in his practice.

After repeated trials of the new measure in my own service, in which it continually, if possible, more and more approved its essential value, I came to think — as I still think to-day — that my work in the specialty would be greatly embarrassed should I be deprived of it.* Still far-

* I beg gentlemen will not suspect me of a covert attempt to advertise my little instrument, in the somewhat extended space given to the version of the service it has rendered me. The day for all advertising has long since passed; indeed, if any consideration of a personal character had place, sensitiveness at the nearly absolute failure of the instrument to serve others than myself would lead me to avoid all allusion to the subject: but the day for sensitiveness has passed also.

ther, what myself had found invaluable upon full experience, it seemed to me that some of my medical friends might find valuable also. But on investigation its manufacturers told me that my surgical contribution elicited no inquiry, met with no sale; it needed to be introduced. Introductions accordingly ensued, by various legitimate methods, on different occasions, always in good faith and with a degree of confidence as to results. To this day I have never learned that any results followed these efforts. As confessed in the note, the day long since went by when I ceased my educative and proselytizing activity in behalf of my little instrument. Long ago I reached the conclusion and rested upon it, that my modest instrument must do all its work within the modest limits of my own practice. It is not, however, because its service has been of so much consequence to myself, but because this service was immediately essential, and had an unavoidable bearing upon the present discussion, that the present lengthy allusion is given place. I do not estimate its value to myself, — it is of no importance that I should, — but it is in the interest of my patient that the instrument has approved its worth, — of her delicacy, comfort, and convenience. Suspension of the speculum, substitution for the speculum, — in this way was the service rendered. Moreover, much of the time it is indifferent with me whether I visit my patient by daylight or in the evening; there is no need of up-drawn curtains, hardly of up-drawn skirts, of bed or chair drawn up against the window.

The third — the second positive — error attendant upon my early years of practice in our specialty was one which I was much longer in receding from than I was in recognizing; indeed, my correction of it to this day has not been complete. Moreover, it has to do with a province of the specialty the indications for action and non-action wherein are difficult of definition. What should be the attitude of the gynecologist, on general principles, towards the young, unmarried female who is a supposed subject of local

disease? Perhaps all of us have at some period seen somewhat of the evil likely to attend a too prompt and ill-considered suggestion of examination in patients of this class, or counsel which implied continuous treatment. Perhaps the mischief, possibly resultant from such policy, was presented to my mind in an exaggerated light; however this may have been, I can now see, and am prepared to confess, that I erred in an opposite direction. I could easily recall cases of years ago, their details still being so well remembered that they might be reported clinically, where I strongly decided against exploration in the interest of diagnosis, and counselled against treatment where, questionless, I should have recognized conditions requiring immediate attention; and this only because the patient belonged to the class now under discussion. More than once thereafter the local lesion, refused attention, still developed until it was presented in such form as to *demand* treatment.

One case in particular might be very briefly recalled where these *Fabian tactics*, pursued for fully two years, permitted such aggravation of the original disease as finally to make evident the necessity for interference. Exploration disclosed the presence of so grave and complicated a condition that, in consideration also of the high personal estimation of the patient and of her family, I was glad to avail myself of the larger skill and experience of Dr. Warner, in an associated treatment of the case throughout its earlier phases. Thereafter, and for a period of two years, during which I had care of this case alone, the speculum was never used; the uterus meanwhile passing through stages which pertained to an organ presenting an extreme degree of parametritis, engorgement, and retroflexion, and an organ nearly restored to the normal status of size and position. The patient has kept her health for years past, so far as I know, and is now happily married.

Doubtless, a comparatively early resolve to dispense with the speculum as much as possible, and pursue my local work

without its aid, contributed considerably to correct and obviate the error just confessed. From a review of an extended experience with the unmarried, I should pronounce the hymen quit exceptional which has so small a diameter and is so inelastic as to oppose an effective resistance to the introduction of the exploring finger and of the sound; moreover, such means and measure of exploration ought not often to be very painful: I think my confreres must assent to the correctness of this assertion. Still further, I think I shall carry them with me in my second assertion, that to introduce the speculum with the young unmarried — I will not say inconsiderately, but thus to force the vagina at all, except after weighty consideration, great reluctance, and every effort to avoid such interference,—is greatly to be reprobated.

As I grow older, gentlemen, I have a respect for the privacy, the purity, and the prerogatives of young virginity which I cannot remember as existing in any such degree, at least, in the earlier years of my practice. The development of the sentiment was not helped by daughters I have seen grow up about me,— this blessing was denied me: upon the face of my mother I was privileged to look only during such infantile years that no memory remains of her form and features. Perhaps the culture of gynecology has helped the growth of the reverent feeling to which I allude. I can truly claim that the specialty has not been pursued in any such way or spirit as to depress or discourage such growth. In the maidenly subject whom I have decided should be examined, and whose *atrium vaginæ* is guarded, nearly occluded, by the exceptionally modified hymen, which consists of a firm, tough, indistensible membrane, with pupillary central orifice, not admitting even the first joint of the finger, and hardly ensuring ready and complete evacuation of the products which follow the menstrual molimen; hesitant as I am otherwise to cause permanent change of parts, in such subject I do no injury if I enlarge the restricted open-

ing, even though by a tear. She is better for the modification, which, also, is in the interest of a future husband.

The next error to be emphasized may be characterized as having its source in false therapeutic deductions, drawn, none the less, from data physiologically sound and correct. One of the first facts or principles of a general nature impressed upon me in my early gynecological experience, alike by direct observation of the practice of others and by the repeated and emphatic testimony of some supposed to speak with authority, may be thus conveyed,—the statement, moreover being entrenched by marks of quotations: "*The interior of the uterus will put up with an immense amount of abuse.*" (Physiologically, I repeat, and beyond question, such assertion must be true; for consider the inevitably frequent grave injury, the not infrequent fatality, which should have attended the practice of the constantly recruited army of medical neophytes, for twenty-five years past, many if not all of whom were accoutred with the inflexible sound, and self-commissioned ("*aut inveniam viam aut faciam*") to plunge the same into the uterus of whatsoever woman they might prevail upon to submit to the assault.) Indeed, in my own view, there are few facts in gynecology more worthy of remark than the amiable deportment of a uterus, which hitherto had endured no hardship and had known no experience, except the monthly extrusion of menstrual blood, upon occasion of sudden attack with a sound, awkwardly introduced and urged with force, sometimes threatening creation of a false passage.

When, however, I began to learn from the study of my own practice, a scrutiny of its results present and subsequent, I was soon put on the track of the discovery, that there is very great variety of susceptibility as respects response to intrusion and irritation of the endometrium; that some patients feel little pain at the time, and suffer little afterwards; or, again, suffer little at first, and greatly not long after; others are hypersensitive to the slightest

contact, though there may be no sign of inflammation; while an occasional subject displays little else than a subsequent and a general nervous excitement and prostration: the lesson learned, in short, and which demanded modification of my previous practice, was,—that the sound was a safe instrument only after its possibilities of danger had been realized.

It was, therefore, comparatively early in my experience, but not until I had been in the way of doing some mischief, that it was perceived that the often-quoted verse of the Latin poet, "*Mulier varium et mutabile semper est*," was true also of the manner in which woman receive the sound and reacts after its withdrawal; although Virgil could hardly have contemplated such interpretation of his verse or extension of its application. And, still, it was not until after a term of years that I reached the resolve, from which now I never deviate, not to enter the sound beyond the internal os, except with the woman who is at her own home and upon her own bed. As respects this practice and the opinion which supports it, I suspect many members of the Society will hold a different position. But more than once, when even the foregoing cautions were adhered to, and in a subject who presented no contraindication to the operation, having introduced the sound with wonted caution and gentleness, having given little or no immediate pain, and having left the patient comfortable,—yet, even thus, I have been summoned several hours afterwards to find her in the throes of severe uterine colic, and presenting a high degree of nervous excitement, although I could not learn that there had been indiscretion on her part after my leave. Such experience is confessedly rare; but when it has appeared it has been, as intimated, with one who had enjoyed every protection, and where I had had no cause to expect such sequel; nor have I ever learned where or how to anticipate it.

I have great respect for the Simpson sound (and little, I

may add, for that which, whether known as the *Lente* or otherwise, is flexible and does not know what course to follow when once started on its way): the Simpson I use constantly, and should not know how to dispense with. It is with me an essential weapon of diagnosis, and its exploratory insertion an invariable preliminary measure to the local application effected by my shielded instrument; in its latter service, it both opens the canal and assures me as to its direction. *Conjoined palpation and manipulation* came in long after my student days. I think such method must often be much more tedious, trying, and painful to the patient than exploration by sound; for my own convenience and satisfaction, at least, nothing can take the place of the latter. With careful attention always given to the conditions of its safe employment, which with one exception (strict scrutiny into the patient's temporary state, as respects presence of menstruation or pregnancy) have been already noted and need not be reviewed, I believe the sound to be as safe as it is invaluable; an experience of at least fifteen years in its constant use, in which I cannot recall a single real mishap, gives me confidence in making this statement. It is true, upon second thought, that among the conditions already presented as essential to the safety of its use, I had not implied that the instrument must always be *strictly clean*, and only entrusted to one who has had considerable previous experience in its introduction; but such salvo is hardly necessary of mention before my present audience. But upon the one point, gentlemen, of having my patient at home and where she can and will rest, at once and for some time after the operation, I have come to insist rigidly and invariably. I will not say that I would as soon insert an unclean sound as to insert the sound for a patient at my office or house, — from which she is to ride or walk to her own home afterwards, — but I can assert that, to the best of my knowledge, I have not done one or the other, certainly for the last ten years, and do not intend to break such record in the future.

But I must move towards the relief of the patience of those whom I address. It was my purpose to occupy less time and space, and still, within somewhat narrower limits, to have justified the acknowledged "*peccavi*" by at least two additional specifications. I will, however, content myself — and doubtless more content my auditors — with their mention only.

A fault in my early gynecologic work was a too great hesitation to use the uterine supporter or pessary, even where I was well assured I could have found and fitted an appropriate instrument in a given case. I was far too long in receding from this error, even after I had realized it to be such. To define or amplify my meaning, in this assertion, would hardly be in keeping with the promise just given.

That which shall stand as the final error in the present *confession* was longest of all in receiving recognition; indeed, I believe that I have added to my knowledge in the direction of its correction within the past year. I suspect I have always, until perhaps quite recently, given undue prominence and allowed undue frequency and force to the application carried within the uterus, and pushed, in the majority of such cases, quite up to the fundus. I fear I have been too ready and aggressive in resort to this heroic measure ("*the interior of the uterus will put up with a great deal!*" — such treatment could do no harm, in any event!) It has been a comparatively recent discovery with me how much can often be accomplished by applications which do not disturb the endometrium, which are strictly extra-uterine, and yet designed and observed to exert their share of therapeutic influence within the organ.

DISCUSSION.

Dr. A. P. Clarke said that though the title of Dr. Field's paper was somewhat peculiar, yet the paper as read was full of interest; for it brought into retrospective view some of the teachings he had received, and the method of practice relating to gyne-

cology that was largely in vogue during his student days. Many years ago, on being called to treat a patient for a uterine lesion, he made use of a speculum, and was afterward rebuked by an older practitioner, who remarked that the educated touch, or "finger vision," as it has been aptly termed, would have been quite sufficient, and added that the use of the speculum should be resorted to only in extreme cases. That "finger vision" alone was relied on in the examination and management of many morbid conditions is evidenced by the practice that prevails in the obstetric branch. A distinguished practitioner of medicine was once summarily dismissed for having made use of "ocular vision" in a case where there was retention of urine. That "finger vision" was not peculiar to our own country may be inferred from the lines of Southey written in praise of Arbuthnot, when that poet makes mention of "Arbuthnot's gentle touch." Thanks to Sims for the development of the uterine speculum, and for the growth of more rational and healthful sentiment in the practice of gynecology. In regard to what has so often been ascribed as untoward effects resulting from the use of Nitrate of Silver in uterine lesions, he was inclined to the opinion, that in most cases such phenomena were not owing so much to the use of any special local agent as to the failure of the operator in restoring the displaced organs and lacerated parts to their normal relations. No doubt, many cases in which the vestibulum vaginæ had become very narrow from progressive atrophy have been supposed to be induced by the local applications of silver nitrate. In regard to employment of the vaginal speculum and the uterine sound in the unmarried, there are cases in which these instruments are imperatively demanded. In a case of marked anteflexion the uterus should be restored, and a suitable pessary adjusted to relieve cystitis. The *dictum* that the sound should not be employed at the physician's office, but only at the patient's residence, he regarded as rather too sweeping; for in the majority of cases when the sound is disinfected and rightly applied it will not produce the slightest trouble. Admitting, however, that occasionally disturbances arise from passing the sound, many women cannot wait on that account. If such reasons regulated our conduct in other matters, all farther advance in progress would be arrested.

Dr. H. C. White said that he had been much interested in

the paper, and that he endorsed the sentiments expressed therein. In regard to the introduction of the sound at the doctor's office, he had once seen a warning case, where, after the introduction, the patient rode two miles. Inflammatory symptoms occurred, and the case came near ending fatally.

Dr. M. L. Brown said that he believed that many physicians could narrate similar experiences, if they would. He remembered a case of a brother practitioner located in his vicinity passing a sound for a patient at his office, to ascertain, it was presumed, the position of the uterus; the patient afterwards walking home. Eight days from that time she died, and the death was set down to inflammation of the bowels. He believes that intra-uterine applications and the use of the sound are very often resorted to when unnecessary. In making such applications with Dr. Field's applicator, he has himself twice produced uterine colic, once of frightful intensity, so that latterly he did not have recourse to that mode of treatment as often as formerly.

Dr. L. F. Warner testified to the general excellence of the paper. An attack of uterine colic is most painful to witness. It is caused by the closure of the os uteri, and can be relieved by another passage of the sound to open the os. Women themselves frequently bring on an attack of uterine colic by injecting water into the vagina with a syringe which has a central hole in the end of the nozzle. Dr. W. has used the shielded applicator somewhat; but he does not feel that he can accomplish with it what he can with the aid of the speculum. He wants to see what he is doing, just the same as if any one was making an application to the throat, he should want a tongue depressor used so that the operator could see to put the application where it was needed. He thinks that the examination of young girls should not be attempted unless there is undoubted evidence of the necessity for local applications; and, when an examination becomes necessary, he does not hesitate to make it, any more than he hesitates to examine the throat. If the hymen is intact, he examines by the rectum first, and by this means he can diagnosticate displacements, etc., of the uterus. It should be remembered, however, that the hymen is capable of much dilatation without rupture. He has treated several cases for a long time in this way.

He believes that a man who has good judgment and ex-

perience can introduce the sound at his office without injury to his patient. The introduction itself does no harm; the trouble arises from what is done with the sound after its introduction. He does not know of a case during the last ten years where bad results have followed the use of the sound. In his early practice cellulitis did sometimes follow, but at that time he used force. He believes that others will agree with this experience. He remembers (twenty years ago) when Nitrate of Silver was about all that was used for applications. It did produce bad results in the shape of bands of adhesions extending from the cervix to the vagina, simulating an old burn. The speaker has often used the solid stick, but never a solution of Nitrate of Silver. He takes the precaution to place cotton saturated with salt water under the cervix, in order to neutralize the superfluous salt. He now uses concentrated Nitric Acid on the cervix, and this he always takes the precaution to neutralize with an alkali. He believes that we should not condemn everything that has been used in gynecology because it has been used wrongly.

Dr. F. L. Burt remarked that there is an enormous amount of practice in this line. He believes that it would be a good plan if each one of us would review his work more frequently. He has had no personal experience with using Nitrate of Silver, but has seen several cases where bad results seemed to show that it had been injudiciously used. Thus he had seen bad cicatrices and bands of adhesions extending from the cervix to the vagina.

In the use of the speculum he has never had any complaints. Married women certainly do not object to its employment; and it is his belief that we should avoid as far as possible any examination of unmarried girls. When necessary, a rectal examination may give sufficient information. He does not feel satisfied to make an intra-uterine application without seeing where it is going. Even with the aid of the speculum he has occasionally had difficulty, and he considers the speculum a necessity for this purpose. The use of the sound has been abused, but he believed that a *clean* sound, when used properly, will not produce bad results. The treatment of fibroids, etc., by electricity has now become very extensive, and for this the sound has to be passed on every occasion. If bad results occur, he believes that they are due to electricity, and not to the sound.

Dr. John F. Couch, of Somerville, a guest of the Society, remarked that he could hardly reconcile the ideas he had received from the paper: that the reader should have a large gynecological and general practice for twenty-five years, and that he had never passed the sound in his office. He failed to see how the sound, when properly introduced, can produce evil results, except in the case of old inflammatory trouble. The disturbance is generally due to something besides the actual introduction of the sound. Both the use of the speculum and bimanual examination he has always considered important adjuvants, and in fact a necessity, in the examination and treatment of the uterus. The finger may be thoroughly educated for obstetric work, and be ignorant in gynecological practice. He has seen Nitrate of Silver applied to the mucous membrane of the uterus and vagina; and he has applied it himself, without feeling that he was doing anything very heroic. It is used as an application to other mucous membranes without injury, and it is very doubtful if any serious damage can be inflicted by it on a healthy membrane. Its too frequent application in a concentrated form to the cervical canal might result in stenosis, and in that region its use should be more limited. Frequently it happens in medical teaching that some one in authority calls a halt in a particular method of practice, and immediately, without giving the subject further thought, the rank and file of the profession adopt the verdict, and pronounce the treatment "no good." The reader of the paper must have great difficulty in attending to his gynecological practice, if, as I understand him, he relies upon the sound to determine the position of the womb, and never passes it on a patient in his own office.

Dr. C. W. Stevens said that he uses the sound in his office quite frequently, and that he does not know that he has ever caused uterine colic in this way. He takes the most thorough antiseptic precautions. He first covers his speculum with Sarg's Glycerine Soap, to which Carbolic Acid (1 to 20) has been added; then he sprays the vagina and cervix with a 1 to 30 solution Carbolic Acid; and, finally, the sound is dipped in Eucalyptus oil (1 part to vaseline 7 parts). He has used the Simpson sound a good deal; but has lately found great satisfaction in the use of a flexible hard-rubber sound, of which he has several sizes.

Silver Nitrate, in a solution of from 10 to 30 grains to the ounce,

he has found useful in chronic vaginitis and cervical erosion. He has also used fuming Nitric Acid with benefit. He recalled one case in which he had recently applied concentrated Nitric Acid to the whole length of the endometrium. The case had been treated for a year by other physicians, with no benefit. The patient was a lady advanced in life, with granular cervix, causing a continuous moderate hemorrhage. There seemed to be only three methods which promised any benefit; viz., 1, Galvanic cauterization with positive pole; 2, Curetting; and 3, Nitric Acid. As the patient decline curetting, Nitric Acid was used with good result. He first introduced a wad of absorbent cotton saturated with an 8 per cent. solution of cocaine. After the lapse of six minutes the cervix was much dilated and insensible to touch. The acid was thoroughly applied. There was no pain, and she had no pain subsequently, nor inflammatory sequence.

As to the use of a speculum, he does not find patients who need intra-uterine treatment object to its use. Without the aid of sight, the liquids of the applicator would often flow back and injure the vagina; and, unless the cervix were well dilated, it could not be so readily applied as when assisted by vision.

Dr. W. Symington Brown remarked that the use of Nitrate of Silver is almost obsolete. Dr. J. Henry Bennet, of London, formerly recommended it; but the speaker had seen the most atrocious results from its reckless employment. He begged to differ from the opinion of the reader concerning the routine use of the speculum; for he believed that we should bring to our aid all of our senses when we have a chance to do so without impropriety. Properly managed, there is little or no exposure, and there is seldom any objection to its use in the examination of married women. He recalled a case which emphasized the importance of an examination of the unmarried woman when certain symptoms indicate it. The patient, who was forty-three years old, had been flowing profusely for three years, and was reduced thereby to an extreme condition of debility. She had been under the care of several regular physicians, but no examination had been asked for or made. When the case came under his observation, he at once requested an examination, and the patient readily consented. He found a fibroid polypus about two inches long protruding into the vagina, attached by a thick pedicle to the corpus uteri. It was

easily removed with the ecraseur; recovery was rapid and complete, and the woman has since married. The hymen is an old-fashioned bugbear. A great many young women have none. On the other hand, when serving in the Glasgow Lock Hospital with the late Dr. Paterson, he recalled the case of a young prostitute who had a perfect hymen. Dr. Thos. Addis Emmet says that he has entirely given up the use of the sound; but he cannot agree with this extreme view. He objects to the Simpson sound on account of the knobs, and prefers a smooth instrument, such as those manufactured by Matthieu, of Paris. In these days when so much is said about *germs*, he believes that we should take all reasonable precautions against infection. A sound may be most effectively and easily sterilized by passing it through the flame of a spirit lamp just before using, allowing a moment for it to cool.

Dr. Field remarked, in effect, that the hour was late, and he would waive the privilege of closing the discussion.

IS OBSTETRICAL ANTISEPSIS PRACTICABLE OR NECESSARY?

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OF BOSTON, MASS.

Read by title, April 11, 1889.

THE question which forms the title of my paper might seem to imply a disbelief in Antisepsis. That I may not be considered antagonistic to the general views on this matter, I hasten to express my faith in the value of Antisepsis under certain conditions.

Antiseptic treatment may be divided into two general classes, — Hospital Antisepsis and Antisepsis in private practice. With the former my paper has little to do; nor do I intend to enter into a lengthy discusssion of statistics familiar to you all. I wish only to present, in a cursory way, some views personal to myself.

There is no doubt, since the introduction of rigid Antisepsis, that the death rates of maternity hospitals have been much reduced; but, great as is the reduction, the death rate of such institutions, even under strict Antisepsis, is not yet as low as that of private practice without such precautions. When we consider the great claims made for Antisepsis, the cleanliness that prevails in a hospital, the strict attention to detail that can be enforced; and, on the side of private practice (especially amongst the poor and ignorant), consider the difficulty of enforcing not only Antisepsis, but even ordinary cleanliness, the many drawbacks, hygienic and otherwise, that must inevitably surround the patient, — the wonder is, not that the death rate of maternity hospitals approaches nearly to that of general practice, but that it is

not very greatly less. Although statistics prove that Antisepsis in hospitals is beneficial, and therefore more or less practicable, it does not follow that it is so in private practice where a different state of affairs presents itself.

Private practice itself can be divided into two classes, the well-to-do and the poor. With the former, it is generally easy to insist upon some antiseptic precautions, but with the latter it is well nigh impossible. You may give your orders; they will only be disobeyed; and unless the physician is willing to (as he generally must in such cases) play the part of nurse, the patient will not only not get proper care, but is almost certain to get that which is improper.

A large part of my practice is among such people, and I have found that no order is strong enough to insure anything like reasonable Antisepsis. It is almost self-evident that amongst such people, who have neither the means nor the will, Antisepsis is impracticable; moreover, it seems to me that it is scarcely necessary.

I enforce as strict cleanliness as possible; but where the patient is actually begrimed with dirt, and the sheets, if there are any, do not appear to have been washed since the Deluge, one cannot expect much in that direction. I always wash my hands thoroughly where it is possible to do so; but it is often not possible, owing to the urgency of the call, and I have not noticed that such patients suffer more than others. It is advised by obstetricians that very few examinations be made. This is perhaps good advice; but I have found that, unless the accoucheur has his finger quite often in the vagina, the patient considers herself neglected. I am convinced, also, that the patient does much better when she thinks that the doctor is helping her. For these reasons, when I consider it necessary to stay with a patient, I examine frequently and at great length. I make it a rule never to interfere with the os, except in case of necessity, and in all ways I leave the case, where it is safe to do so, to Nature. If the delivery is a normal one, I do nothing in

the way of Antisepsis, as such. I clean the patient of blood, put dry cloths beneath her, apply a napkin, and leave her for about twelve hours; at the expiration of which time, if the bed and body clothes are soiled, I change them. I insist very strongly upon the patient remaining in a prone position; not even permitting her, if I can avoid it, to sit up for the purpose of emptying the bladder or bowels. If the case is an instrumental one, or one of manual delivery of the placenta, I give a vaginal injection of hot water, sometimes adding vinegar. In such few cases of fever as occur, I have used intra-uterine and vaginal injections; but such methods, while they are sometimes serviceable to combat disease, when once started seem to me well nigh powerless to prevent it.

My experience has not been extensive, but such as it is it has taught me to look with scepticism on the great stress laid upon Antisepsis. I have found that troubles are more likely to follow upon indiscretions of the patient in eating or drinking, or upon sitting up too soon, than upon the absorption of poison. I believe that, given a normal or nearly normal case of delivery and a proper condition of the system, the patient will resist any attack of germs, whether by external or auto-inoculation.

When one sees an uncleanly puerperal patient lying for days upon a feather bed which has been soaked with blood, and finds that she has absolutely no disturbance of temperature, — when one sees such a patient living under the most unfavorable hygienic conditions, — and not one but many pass through a perfectly normal lying-in, he is likely to have his belief in the virility of germs and the value of Antisepsis very much shaken.

A prominent obstetrician of this city is reported to have said that any man who lost a patient by puerperal fever should be indicted for manslaughter. Although I have not yet laid myself liable to such an indictment, I do not agree with this dictum. I believe that if a patient's system is in

the proper condition for the development of puerperal fever she will develop it, no matter what prophylactic steps are used; for I do not believe that any precautions, consistent with the welfare of the patient, are sufficient to prevent the absorption of deleterious matter, if the system is in a condition to absorb it.

While I do not attempt to deny the benefits which bacteriologists have conferred upon medicine, I am not afflicted with that common disease, which, on account of the nationality of its greatest advocates and the object of its researches, may be called germ-mania. While it may be true that every disease is caused by a germ particular to that disease, still it seems to me that the action of the germ must be similar to that of a spark on gunpowder. It is of course correct to attribute the explosion to the spark, but it certainly would seem that the gunpowder has more to do with the catastrophe. In our haste to find the germ cause of a disease, we overlook the condition of the system which makes it possible for that germ to live, develop, and propagate. If germs had such power as is ascribed to them, who among us would be safe, absorbing as we do in every way germs supposed to be hostile to the human economy?

Why is it that the anxious mother of a child ill with diphtheria, will, although living almost constantly in the germ-infected air, generally escape the disease, while another person, whose exposure to the same case has been but slight, contracts the disease? The answer to this question can only be given in the unknown equation, — the state of the system.

There is perhaps no condition which is, theoretically, so exposed to danger of germ attack as the puerperal, and yet there is no other equal predicament which will, of itself, show so little trouble resulting from that cause. If germs are so virulent and have such power as is claimed for them to initiate disturbance in the system, why is it that in the puerperal state, than which no condition seems

to be more liable to attack, so few women contract puerperal fever?

If the danger from the absorption of deleterious matter (germs or what not) be so imminent, we might reasonably expect that out of the many thousands of lying-in women, who have lacerations and abrasions of the os and vagina, — the interiors of whose uteri are open wounds, and whose vaginæ are sacs in which remain for days matter which often "smells to heaven," and which, if injected into the blood of a dog, would cause its death, — I say we might with reason fear that a very large percentage would develop some form of blood-poisoning: and yet the reverse is true. It would seem that nature, anticipating this condition, had fortified the system to resist a danger, which, if it came upon it suddenly, as in the guise of a surgical operation, would produce serious if not fatal results.

In a practice of five years, I have delivered two hundred and forty-four women. Of these, eighty-two were primiparæ; twenty-four were torn to a greater or less extent, one only into the sphincter. Twins occurred five times; breech presentations, including foot, six times; shoulders, once; face, twice; brow, twice. There were three cases of eclampsia, and two of placenta prævia. Forceps were used seventeen times. There were twenty-two deaths of children, sixteen of the twenty-two being premature. Of the mothers, none died. I find record of six cases of septicemia, only two of which appeared at any time to be serious. They all occurred after difficult labors, and were all treated successfully in the usual way. I have had, of course, other cases where the temperature went up a little, from many different causes; but such cases generally reacted easily to internal medication, and did not need or receive any particular antiseptic treatment. In fact, I believe that such mild cases are often, by the very means used to control them, — namely, intra-uterine or vaginal injections, — turned into cases of more serious consequence. My rule has been

not to use injections, especially intra-uterine, unless there is a pronounced chill or an excessive rise of temperature, indicating absorption of putrid matter. In such cases injections are serviceable, inasmuch as they wash away the offending substance; and for this purpose it is an open question if plain hot water is not as good as anything yet advocated. That antiseptic solutions, of sufficient strength to kill bacilli, can be injected into the uterus with impunity, I do not believe.

Besides these cases which I have myself delivered, I have attended probably as many more for my father, Dr. A. E. McDonald, and I have yet to see a death from puerperal fever. During the five years in which I have been cognizant of my father's business, (I cannot give the number of his cases, but it must be several hundreds,) I know of but two deaths in his obstetrical practice: one a case of craniotomy, in which the patient died of pneumonia, on the fourth day; the other a case of septicemia, which occurred in a well-to-do family where every antiseptic precaution was used, under the care of a regular nurse.

It is to me one of the mysteries of practice why patients living in poverty and squalor, — in fact under the very worst imaginable conditions, — recover so well from diseases of all kinds; for this peculiarity which I have noted in obstetrics extends to other diseases, especially to contagious ones; and my doubts about the activity of germs is based upon the action of these diseases, as well as on the condition of the lying-in woman.

I do not wish it understood that I disbelieve in germs or in Antisepsis; in the present state of science that would be absurd; but I think that too much stress is laid upon the germ theory of disease. I believe that some diseases are caused by germs, and that Antisepsis (which is, after all, mainly cleanliness) is of great value; but I also believe that Antisepsis, as often used, especially in obstetrics, is not only useless but harmful. I believe that the germ of

any disease is, in itself, as inoffensive as so much dust; and that when germs enter the system, as they are continually entering, they must find there a particular condition, an unknown soil, which alone has the power to rouse them from their harmless hibernation, and cause them to blossom forth into the flower of disease, whose fruit is death.

INDEX OF AUTHORS.

Page

ADAMS, DR. Z. B.
Discussion on Treatment of Constipation 62
Opposes vaginal douche in normal labor 182
Does the continuance of the species act only upon conditions of disease? . . . 184
Injections in normal labors may be dangerous. . . . 189
Aitken 200
Apostoli . . . 22, 23, 248
Aristotle 26
Atlee, Dr. W. L. 201
Athill, Dr. Lombe . . 92, 258
Aveling, Dr. J. H. . 149, 150, 151
Avicenna 148
Aufrecht 230

Barnes 94, 145, 259
Barker, Dr. Fordyce, 71, 145, 182, 184
Bastian 236
BATES, DR. MARY E.
"*Uterine Fibroid with Pelvic Cellulitis*" 192
Discussion on Cancer of the Breast 322
Beale, Dr. Lionel . . . 236
Bedford 145
Bell, Sir Charles . . . 210
Bennet, Dr. J. Henry . . . 94
BETTS, DR. HELEN L.
Discussion on Chronic Cystitis in Women. 117
"*The Dress of Women: Its Relation to the Etiology and Treatment of Pelvic Disease*," 119

Page

Bigelow, Dr. H. R. . . 134, 189
Biggs, Prof. H. M. . . . 81
Birch-Hirschfeld . . . 230
Bischoff 288
Bouchard, Dr. 101
Braidwood 232
Braun, Prof. Karl . . 73, 83
Breisky 134
Brown, Baker 283
BROWN, DR. MARSHALL L.
"*Gynesic and Obstetric Uses of Chloral Hydrate*" . . . 159
Discussion on ditto . . . 164
Discussion on Errors and Misapprehensions . . . 372
BROWN, DR. W. SYMINGTON
Discussion on Ethics of Abortion 40
Discussion on Habitual Constipation in Women . . . 51
"*Chronic Cystitis in Women*" . 105
Discussion on ditto . . 115, 118
Discussion on Cicatrices in the Collum Uteri . . . 140
Discussion on the Obstetric Forceps. 157
Discussion on Chloral Hydrate, 164
Discussion on Post-Uterine Abscess 172
Discussion on Bacteria in Parturition 190
Discussion on Uterine Fibroid with Pelvic Cellulitis . . 196
Discussion on Septicemia . 207
"*The Role of the Ovary*" . . 209
Discussion on Induction of Premature Labor . . . 339

Page
"*Specialists and Especialists*" . 350
Discussion on Errors and Misapprehensions . . . 375
Bryant 200
Burne, John 49
BURT, DR. FRANK L.
Discussion on Chronic Cystitis in Women . . . 115, 116
Discussion on Uterine Fibroid with Pelvic Cellulitis . . 197
Discussion on Septicemia . 207
Discussion on Cancer of the Breast 321
"*The Animal Suture*" . . 340
Discussion on Errors and Misapprehensions . . . 373

Carlyle, Thomas . . . 18
Celsus 148
Chamberlen, Hugh . . . 150
Chamberlen, Dr. Paul . . . 149
Chamberlen, Dr. Peter . . 150
Chapman 124
Chapman, Mr. Edmund . . 151
CHURCH, DR. MOSES D.
"*Post-Uterine Abscess*" . . 167
Discussion on ditto . . . 172
Churchill 148, 149
CLARKE, DR. AUGUSTUS P.
Discussion on Ethics of Abortion 41
"*Rapid Dilatation of the Cervix Uteri*" 91
Discussion on Chronic Cystitis in Women 112
Discussion on The Obstetric Forceps. 157
Discussion on Chloral Hydrate, 165
Discussion on Post-Uterine Abscess 171
Discussion on Uterine Fibroid with Pelvic Cellulitis . 195, 196
Discussion on Septicemia . 206
"*Faradism in the Practice of Gynecology*" 247

Page
Discussion on Cancer of the Breast 319
Discussion on Errors and Misapprehensions . . . 370
Cleaveland, Prof. . . . 17
Coe, Dr. Henry 285
Cohn 225, 231
Couch, Dr. John F. . . . 374
Cordes, A. 22
Coze 232
Cumming, Dr. William . . 92
Cushing, Dr. E. W.
Discussion on Ethics of Abortion 41
Discussion on Treatment of Constipation 63
"*Relations of certain Bacteria to Puerperal Inflammations*," 65
Discussion on Cicatrices in the Collum Uteri . . . 140
Acceptance of Germ Theory in Germany 190
Paper on Operating for Ruptured Perineum . . . 294
Cutter, Dr. E. . . . 180, 196
Czempin 138

Davainé 229
Debron 93
Deneke 231
Dieffenbach 279
Drinkwater 151
Duncan, Dr. Matthews . . 91
Duré, M. 151

Eberth 230
Ehrlich 227
Eisenmann 179
Emmet, Dr. T. Addis, 91, 94, 113, 124, 133, 135, 179, 284, 285
Ernst, Dr. H. C. 102

Fehleisen 232
Feltz 232
FIELD, DR. HENRY M.
"*Treatment of Constipation*" . 52

Page
Discussion on Chronic Cystitis in Women 111
Discussion on Chloral Hydrate, 164
Discussion on Post-Uterine Abscess 173
The importance of Constitutional Remedies . . . 354
"*A Few of the Errors and Misapprehensions of my Earlier Gynecological Practice*" . 356
Finkler 93, 231
Freund . . . 75, 88, 288
Friedlander 230
FRISBIE, DR. JESSE F.
Discussion on Chronic Cystitis in Women . . . 114, 115
Discussion on Cancer of the Breast 318

Gaffky 230
Garrigues, Dr. H. J. . . . 101
Giffard, Mr. William . . . 151
Gouch 124
Goodell, Dr. 96
GRAINGER, DR. WM. H.
Axis-traction forceps . . 155
Discussion on Bacteria in Parturition 191
Greenhalgh 94
Gross 304

HANSCOM, DR. SANFORD.
Discussion on Septicemia . 207
Hardy 257
HARRIMAN, DR. HERBERT J.
"*Habitual Constipation in Women*" 46
Hart, D. Berry 147
HAWKES, DR. ESTHER
Discussion on Induction of Premature Labor . . . 339
Hegar 136
Hewitt, Graily . 22, 95, 124, 351
Hippocrates 82
Hodge 124, 257
Hodges 319

Page
Holmes, Prof. O. W. 81
Hunt, Dr. David 149
Hunt, Dr. Otis E. . 113, 115, 116
HUNT, DR. W. O.
Discussion on Treatment of Constipation 63

IRISH, DR. JOHN C.
"*Observations on Ovariotomy*" . 219
Discussion on Cancer of the Breast 318

Jackson, Dr. John H. . . . 207
Jocobi, Dr. Mary Putnam . . 124
Jenks, Dr. E. W. . 285, 290, 283
Jackson, Dr. R. W. . . . 151
JONES, DR. GEORGE W.
Discussion on Cancer of the Breast 325

KELLER, DR. ELIZABETH C.
"*The Induction of Premature Labor*" 328
Discussion on Premature Labor 338
Kelly, Dr. J. E.
"*The Ethics of Abortion as a Method of Treatment in Legitimate Practice*" . . . 25
Klebs 230
Koch, Prof. R. 19, 65, 227, 229, 231
Kolb 124
Kolisko 70
Kundrat, Prof. 70

Langenbeck 288
Lazarewitsch, Prof. . . . 153
Lee, Robert 261
Leeuwenhoeck 225
Lisfranc 124
Lister, Sir Joseph . . 19, 343
Loeffler 82
Lusk, Prof. 188

Macan, Dr. 101
Mackintosh, Dr. 95

Page

MARCY, DR. HENRY O.
President Section of Gynæcology of Ninth International Medical Congress, 1877 . 22
Discussion on Habitual Constipation in Women . . 51
Reported cases of Puerperal Fever 81
Discussion on Cicatrices in the Collum Uteri . . . 141
Dlscussion on The Obstetric Forceps 156
Discussion on Chloral Hydrate, 166
Discussion on Puerperal Metritis 180
"*Bacteria in Parturition*" . 182
Discussion on Uterine Fibroid with Pelvic Cellulitis . . 195
Discussion on Micro-organisms, 245
"*The Perineum: Its Anatomy, Physiology, and Methods of Restoration after Injury*" . 262
Discussion on Cancer of the Breast . , ... 323
Operation for restoring the Perineum 290
Martin, Prof. August . 22, 23, 288
"*The Treatment of Cicatrices in the Collum Uteri and in the Roof of the Vagina*" . . 133
Martin, Prof. E. 133
Martin, Dr. F. H. 196
Martin, Dr. Henry A., 7, 156, 157, 245
McDONALD, DR. A. E. . . 382
McDONALD, DR. R. CYRENE.
Discussion on Septicemia . 206
"*Is Obstetrical Antisepsis Practicable or Necessary*" . . 377
Miller, Prof. W. D. . . . 231
Miguel 225
Mixter, Dr. S. J. . . . 308, 322
Munde, Prof. 128

Naegeli 226
Needham 235
Negrier 216

Page

Neisser 230
Nelson, Prof. Daniel T. . . 196
NELSON, DR. SAMUEL N.
Discussion on Chronic Cystitis in Women 117
"*The Obstetric Forceps*" . . 142
Discussion on ditto . . . 157
"*Micro-Organisms, and their Relation to Disease*" . . 224
Tabulated Experiments with Culture Bulbs . . . 241
Discussion on Cancer of the Breast 325
Noeggerath 212
NORRIS, DR. ALBERT L.
Discussion on Chronic Cystitis in Women 116
Discussion on Chloral Hydrate, 165
Discussion on Post-Uterine Abscess 173
"*Puerperal Metritis, complicated by Malaria*" . . 175
Discussion on Uterine Fibroid with Pelvic Cellulitis . . 197
Discussion on Induction of Premature Labor . . . 339

Obermeyer 229
Ogsten 227

Paget, Sir James 306
Palfyn 151
Paltauf 70
Parker, Dr. W. Thornton . . 63
Passett 65
Pasteur, Prof. . . 19, 227, 235
Paulus Aeginet 148
Peaslee, Prof. E. R. . 53, 201, 219
Penrose 145
Playfair, Prof. . . 153, 258, 261
Pinkham 180
Pollender 229
Pouchet 225, 235
Priestley 168
Prior 231
Pritzl 73

Page
Quinan, Dr. J. R. . . . 148

Von Recklinghausen . . . 230
Reed 22
Richardson, Dr. B. W. . . 159
Richardson, Dr. M. L. . 93, 102, 314
Roberts, Sir William . . . 226
Roice 101
Roonhuysen 150
Rosenbach 69
Roser 133
Rueff 149
Ruge, C. 135
Rutherford 57

Scanzoni 170
Schroeder, Prof. . 94, 134, 136, 287
Silberschmidt 179
Simpson, Dr. A. R. . . 142, 154
Simpson, Sir James Y. . 91, 95
Sims, Marion . . . 91, 94
Sims, J. Marion 201
Skene 107
Smith, Dr. Albert H. . . . 143
Smith, Dr. J. Protheroe . . 95
Smith, Dr. Stephen . . . 86
Spiegelberg 134
STARBIRD, DR. ISAAC W.
Discussion on the Treatment of Constipation 64
Discussion on Uterine Fibroid with Pelvic Cellulitis . 196
STEVENS, DR. CHARLES W.
"*Corrosive Sublimate Internally*" 101
Discussion on Micro-Organisms 245
"*Ergot in Obstetrics*" . . 256
Discussion on Errors and Misapprehensions . . . 374
STODDARD, DR. HENRY B.
Discussion on Chloral Hydrate 165
Storer, Dr. H. R. . 145, 181, 216
Von Solingen, Cornelius . . 152

Tait, Lawson . . . 93, 288
Tilt, Dr. E. J. 93

Page
Tarnier, M. 155
Thomas, Prof. T. Gaillard, 48, 92, 124, 145, 182, 184, 185, 201
Tyndall, Prof. . . . 227, 237

Vacher 232
Verhaeghe 280
Virchow 75

WARNER, DR. L. F.
Discussion on Ethics of Abortion 40
Discussion on Habitual Constipation in Women . . . 50
Discussion on Treatment of Constipation 62
Discussion on Chronic Cystitis in Women . . . 114, 115
Discussion on Cicatrices in the Collum Uteri . . . 138
Discussion on Chloral Hydrate, 164
Discussion on Puerperal Metritis 181
Discussion on Septicemia . 206
Discussion on The Role of the Ovary 218
Discussion on Induction of Premature Labor . . . 338
The Importance of Constitutional Remedies . . . 354
Discussion on Errors and Misapprehensions . . . 372
Warren, Dr. J. Collins, 318, 321, 322, 325
"*The Diagnosis and Treatment of Cancer of the Breast*" . 302
WEEKS, DR. A. P.
Discussion on Chloral Hydrate, 163
Discussion on Post-Uterine Abscess 172, 173
Discussion on Puerperal Metritis 180
Wells, Sir Spencer . . . 170
WHEELER, DR. WILLIAM G.
Discussion on Habitual Constipation in Women . . . 51

Page

Discussion on the Treatment of Constipation 63
Discussion on Post-Uterine Abscess . . . 172, 173
"*Septicemia*" 199
WHITCOMB, DR. CHARLES R.
Discussion on Ethics of Abortion 41
WHITE, DR. HORACE C.
Annual Address, "*The Progressive and Conservative Spirit in Medical Science*" . . 17
Discussion on Ethics of Abortion 43
Discussion on Chronic Cystitis in Women 118
Discussion on Bacteria in Parturition 191
Discussion on Uterine Fibroid with Pelvic Cellulitis . 196, 197
Discussion on Septicemia . 206
Discussion on Errors and Misapprehensions . . . 371
White, Dr., of Buffalo . . . 145
Whitney, Dr. William F. . . 326
Wilson, Dr. Ellwood . . . 96
WOODS, DR. J. H.
Discussion on Chronic Cystitis in Women 116
Wyman, Prof. Jeffreys . . 236
Wylie 286

INDEX OF SUBJECTS.

Page

"*Abortion, The Ethics of, as a Method of Treatment in Legitimate Practice*" 25
Abortion, Legal Definition of . 29
Abortion is Wilful Murder . . 30
Abortion, Use of Ergot in . . 260
Abscess, Post-Uterine . . . 167
Active Members, List of . . 11
Address, Annual (1887), by Horace C. White, M.D., *President*, 17
Agar-Agar 228
Aged, Salines do not agree with, 60
Aloes in Treatment of Constipation 55, 58
American Gynæcological Society, 1878 143
American Medical Association, June, 1883 290
Amputation of the Portio . . 136
Animal Ligatures . . . 294
"*Animal Suture, The*" . . 340
Animal Sutures in Perineorraphy, 287
Anteflexed Uterus, Cure by Dilatation 96
Ante-partum Hemorrhage, Ergot in 259
Antisepsis, Obstetrical . . 377
Antiseptic Surgical Precautions in Labor 187
Anthrax 229
Applicator, Shielded . . . 363
Artificial Fistula for Cystitis . 115
Association of Obstetricians and Gynecologists 248
Axis-traction Forceps . . 154

Bacilli Pyogenes Fœtidi . 68, 79
"*Bacteria in Parturition*" . . 182

Page

Bacteria Termo 185
Bacteria, The Cause of Cystitis . 117
Barnes' Dilator 333
Bates' Garments for Women, 131, 132
Battey's Operation . . . 213
Berberi, Bacillus of . . . 245
Berlin 70, 72
Bilateral Discission of Cervix . 133
Bile in Fœtal Life . . . 28
Bile, "Nature's Physic" . . 62
Bioplasm 236
Blood-poisoning 199
Bougie to Induce Labor . . 333
Buried Tendon Suture, continuous 274

Cancer, Local Origin of . . 311
"*Cancer of the Breast, The Diagnosis and Treatment of*" . . 302
Canula for the Diagnosis of Tumors . . . 308, 322, 327
Carcinoma, Martin's Operation for Total Vaginal Extirpation of the Uterus for . . . 23
Carnegie Laboratory in New York 81
Cascara Sagrada in Treatment of Constipation . . . 58, 62
Castor Oil 55
Catarrh, Complication of Cervical Rents 135
Catgut in Perineorraphy . . 295
Catgut Ligatures, Uses of . . 346
Cathartic, What is a? . . . 54
Catholic Church Views on Abortion and Morals . . . 41
Catholic Doctrine on Justification of Killing 28

Page
Causal Relation of Bacteria to Disease 229
Cellulitis, Pelvic 168
"*Chloral Hydrate, Gynesic and Obstetric Uses of*" . . . 159
Chloral Hydrate in Rigid Os Uteri 160
Cholera Bacilli 230
Chromic Acid to prepare Sutures, 343
Chronic Constipation . . . 52
"*Chronic Cystitis in Women*" . 105
"*Cicatrices, Treatment of, in the Collum Uteri and in the Roof of the Vagina*" . . . 133
Circulation in Fœtal Life . . 27
Citrate of Potassium for Cystitis, 117
Clover Crutch, The . . . 297
Colocynth Tincture for Gonorrhœa 111
Colon, Perversion of Function in Constipation 47
Concealed Laceration of Perineum 276
Congestion of Uterus, Sequences of 124
Congress at Copenhagen, Medical, 1884 101
Congress, Ninth International Medical 22
Constipation, Habitual in Woman, 46
Constipation, Treatment of . . 52
Continual Drainage for Cystitis . 113
Continuous Buried Suture . . 274
Contraction of Pelvis . . . 329
Convulsions, Use of Ergot for . 259
Corresponding Members, List of, 13
"*Corrosive Sublimate Internally*," 101
Corrosive Sublimate Irrigation for Cystitis . . . 115, 118
Cream of Tartar in Treatment of Constipation 61
Criminal Abortion, Evil Effects of, 42
Croton Oil will produce Constipation 69
Curetting Uterine Mucous Membrane 139
Cyclopedia of Gynæcology . . 128

Page
Death of Fœtus Justifies Premature Delivery 330
Decidua Vera 183
Depressor Speculum . . . 300
Development of Fœtus . . 27
"*Dilatation of the Cervix Uteri, Rapid*" 91
Diphtheria, Micrococci in . 232, 233
Drainage, Continual, for Cystitis, 113
"*Dress of Woman: Its Relation to the Etiology and Treatment of Pelvic Disease.*" . . . 119
Douche, Intra-Uterine . . 190
Douche, not Infallible against Germs 188
Douche to Induce Labor . . 332

Eighth International Congress (1884) 293
Elaterium in Treatment of Constipation 55
Electricity in Treatment of Constipation 63
Electricity in Treatment of Uterine Myoma 23
Electricity to Induce Labor . 335
Endometritis, Treatment of . 139
Enemeta in Treatment of Constipation 62
Epsom Salts in Treatment of Constipation 55
Epsom Salts do not Agree with the Aged 60
Equipoise Garments for Women, 13[1]
"*Ergot in Obstetrics*" . . . 256
Ergot in Treatment of Uterine Myomata 22
Ergotine 256
Ergotinine 256
Erysipelas, Relation to Puerperal Fever 189
Especialist, The 352

"*Faradism in the Practice of Gynecology*" 247
Fermentation 226
Finger Vision . . 361, 371

Page
Flint Garments for Women 131, 132
Fœtus, Development of . . 27
Fœtus, Viability of . . . 26
"*Forceps, The Obstetric*" . . 143
Friction of Abdomen to Induce Labor 331

Gaiffe's Pocket Battery . . 335
Gelatine, Nutrient . . . 227
Gentian Suppositories in Treatment of Constipation . . 63
Germ-mania 380
Germ Theory 234
Glanders, Parasitic Origin of . 230
Gonorrhœa, the Cause of Sterility, 212
Gonorrhœa, Micrococci of . . 230
Guinea-pigs Inoculated with Diphtheria 233

"*Habitual Constipation in Women*" 46
Hagedorn Needle . . . 274
Heart Pulsates in Fœtal Life . 27
Heat a Germicide . . . 200
Hegar's Holders 138
Heppner's Suture . . . 288
History of the Forceps . . 148
Hodge Forceps 152
Homicide 28
Honorary Members . . . 24
Honorary Members, List of . 9
Hot Pack for Cystitis . . . 113
Hour-glass Contraction . . 261
Human Being, The Fœtus a . 28
Hystero-epilepsy 214

Idiosyncrasy in Use of Cathartics, 59
Impacted Feces not to be Treated with Senna 60
Interior of the Uterus, Abuse of 367
Insanity Dependent on Sexual Disorders 214
Inflammation of the Uterus . . 124
International Congress, Eighth (1884) 283

Page
International Congress, Ninth (1887) 22
International Congress, Seventh (1881) 295
Internal Irrigation for Cystitis . 114
Intra-Uterine Douche . . . 190
Irrigation, External for Cystitis . 115
Irrigation in Perineal Operation . 298

Jalap Action in Treatment of Constipation 55
Juniper-Oil Catgut . . . 346
Justifiable Homicide . . . 29

Kangaroo Tendon . . 293, 294
Kelley Crutch, The . . . 297
Kelley Pad, The 298
Kennison's Uterine Canula . 204

Lacerations of Perineum . . 343
Ladies, Membership in the Society, 23
Laws, new, necessary concerning Abortion 37
Levator Ani Muscles . . . 266
Lever Movement of Forceps . 143
Lincoln's, Mrs., Potato Soup . 109
Listerism 199
Lister's Formula for Catgut . 343
Lithia Water for Cystitis . . 109
Lochia, The 184

MacEwen's Chronic Acid Catgut, 341
Magnesia, Action in Treatment of Constipation 56
Malaria, Bacteria in . . . 230
Male Perineum, Anatomy of . 263
Marcy Stitch, The . . . 275
Martin's Operation for Total Extirpation of the Uterus . . 23
Measles, Micrococci in . . 232
Mechanical Influence of Constipation 49
Menorrhagia Perplexes Cathartic Medication 61
Menstruation 215
Mercuric Bichloride for Irrigation, 298

Page
Mercury, Action in Treatment of Constipation 57
Metritis, Puerperal, complicated by Malaria 175
Metrorrhagia Perplexes Cathartic Medication 61
Metrorrhagia, Dilatation for . 96
Micrococci, Infection of Uterus by, 188
Micrococcus Vaccinæ . . . 230
"*Micro-Organisms and Their Relation to Disease*" . . . 224
Molesworth's Dilator . . . 333
Mother, Preservation of Life by Abortion 32
Myoma, Uterine 22
Murder, Wilful 29

Nægele Hooks 152
Needle for Deep, continuous Sutures 299
Nervous Phenomena in Fœtal Life, 28
Nitrate of Silver Applications, 141, 358, 371, 373, 375
Nitrate of Silver for Cystitis . 113
Ninth International Congress . 22
Nux Vomica Action in Treatment of Constipation . . . 57

"*Observations in Ovariotomy*" . 219
"*Obstetric Forceps, The*" . . 142
Obstetrics, Ergot in . . . 256
Officers for 1889 7
Operations on the Perineum.
Method of Baker Brown . . 283
Method of Bischoff . . . 288
Method of Dieffenbach . . 279
Method of Emmet . . . 284
Method of Freund . . . 288
Method of Jenks . . . 283
Method of Langenbeck . . 288
Method of Marcy . . . 290
Method of Marcy, Resumé . 296
Method of Martin . . . 288
Method of Tait . . . 288
Method of Verhaeghe . . 280
Method of Wylie . . . 286

Page
Origin of Life 234
Os Internum, Division of . . 94
Os Tincae, Stimulation of, to induce Labor 331
Osteomyelitis, Micrococci in . 232
Ovarian Monocyst . . . 204
"*Ovary, The Rôle of the*" . . 209

Pack, Hot, for Cystitis . . 113
Pain, Perception by Fœtus . . 28
Parametritis, Causes of . . 171
Parturition, Action of Pelvic Floor in 273
"*Parturition, Bacteria in*" . . 182
Parturient Canal, The . . . 146
Pelvic Cellulitis 168
Pelvic Curve of Forceps . . 153
Pelvic Floor, Anatomy of . . 264
Perimetritis, Causes of . . . 171
Perineal Body, The . . . 147
Perineum, Depth of . . . 264
"*Perineum, The, Its Anatomy, Physiology, and Methods of Restoration after Injury*" . . 262
"Philadelphia Medical Examiner, The" on the Introduction of Ether 20
Physician, Relations of, in Abortion 34
Physostigma, Action in Treatment of Constipation . . 59
Pins for Perineum Operation, 275, 292
Placenta 183
Placenta, Retention of, by Ergot . 261
Pneumonia, Diplococci in . . 230
Portio Vaginalis, Operations on . 134
Position in Treatment of Cystitis, 113
Post-partum Hemorrhage treated by Ergot 261
Potato Soup, Mrs. Lincoln's . 109
Preface 3
Pregnancies Recurring, Influence in Constipation . . . 59
Premature Delivery, Justification for 329

Page
"*Premature Labor, The Induction of*" 328
Primary Operation for Ruptured Perineum 274
Primary Union of Perineum . 274
Privy, The, a Cause of Constipation 63
"*Progressive and Conservative Spirit in Medical Science, The*" 17
Prostitutes seldom Conceive . 212
Pubo-coccygeus Muscle, Loop of, 268, — 270
Puerperal Fever, the Result of Invasion of Bacteria . . . 71
"*Puerperal Inflammations, Relation of Certain Bacteria to*" . 65
Puerperal Metritis Complicated by Malaria 175
Puncture of Membranes to Induce Labor 333
Putrefaction 226

Quickening 28
Quinia for Cystitis . . . 112

Rapid Dilatation of the Cervix Uteri 91
Regimen in Treatment of Constipation 54
Regularity in Treatment of Constipation 53
"*Relation of Certain Bacteria to Puerperal Inflammations*" . 65
Relative Value of Lives of Mother and Fœtus 33
Respiration Absent in Fœtal Life, 27
Retroflexed Uterus Cured by Dilatation 96
Rhubarb, Action in Treatment of Constipation 56
Rotunda Hospital, Report for 1883 101
"*Rôle of the Ovary, The*" . . 209

Saline Waters in Treatment of Constipation 57

Page
Scarlet Fever, Micrococci in . 231
Science, Definition of . . . 18
Senna Action in Treatment of Constipation . . . 55, 60
Septicemia 199
Septicemia, Bacteria in . . 232
Septic Bacteria 65
Sex of Fœtus, Determination of . 216
Shielded Applicator . . . 363
Shoemaker's Stitch, The . 295, 348
Siebold Lock, The . . . 152
Silver Nitrate for Cystitis . . 113
Simon's Speculum . . . 138
Simpson Forceps, The . . 152
Skin in Fœtal Life . . . 28
Smellie Lock, The . . . 152
Soda Tartrate in Treatment of Constipation 63
Sound, The Simpson . . . 368
Specialist, The 351
"*Specialists and Especialists*" . 350
Speculum, a Depressor . . 300
Speculum, Use of . . . 360
Spirillum Obermeyeri . . . 229
Spontaneous Generation . . 234
Staffordshire Knot, The . . 223
Staphylococci . . . 68, 77
Sterility, Dilatation for . . 96
Stillé and Maisch's Dispensatory, 258
Streptococcus 68
Streptococcus Frequent in Puerperal Infections . . 77, 78
Streptococcus of Erysipelas . 79
Strychnia in Treatment of Constipation 61
Suture, Continuous Buried Tendon 274
Syphilis, Micrococci in . . 231

Tait's Knot 223
Tait's Operation 213
Tendon, Continuous Buried Suture of 274
Tendon from Kangaroo . 293, 294
Tobacco as a Laxative . . . 63
Trachelorraphy . . . 133, 137

Page
Transversus Perinei Muscles, 265, 266, 267
Treatment of Constipation . . 52
Treatment of Pelvic Cellulitis . 170
Tribunal to Decide Necessity for Abortion 38
Tuberculosis, Bacillus of . . 229
Tumor Justifies Premature Delivery 330
Typhoid Fever, Bacteria in . . 230

Unmarried Female, The . . 364
Urine in Fœtal Life . . . 28
Uterine Decidua . . . 183
"*Uterine Fibroid with Pelvic Cellulitis*" 192
Uterine Myoma, Discussion in Ninth International Congress, 22
Uterine Polypus . . . 202

Vagina in Cross-Section . . 269
Variola, Bacteria in . . . 231
Venesection for Convulsions . 259
Ventilation of Water-closet . . 181
Viability of the Fœtus . . 26, 329
Vienna, General Hospital in . 70
Vienna, Pathological Institute in, 70
Village Hospitals, Establishment of 353
Vomiting Justifies Premature Delivery 330

Whooping Cough, Bacteria in . 230

Yeast Plant, The . . . 227